MAY 8 1942

FOOD INDUSTRIES

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

ANY
FOOD PLAN
IS BETTER THAN
NO PLAN

(*SEE PAGE 29*)

MAY 1942

Two Articles on Dehydration

Food and Fighting Efficiency

Protecting Foods In Air Raids

Near 'Ems Don't Count

Making Industrial Alcohol in Brewery

1942 FROZEN FOODS DIRECTORY

A McGRAW-HILL PUBLICATION

Scientist measuring pH in high-temperature, high-humidity atmosphere of greenhouse.

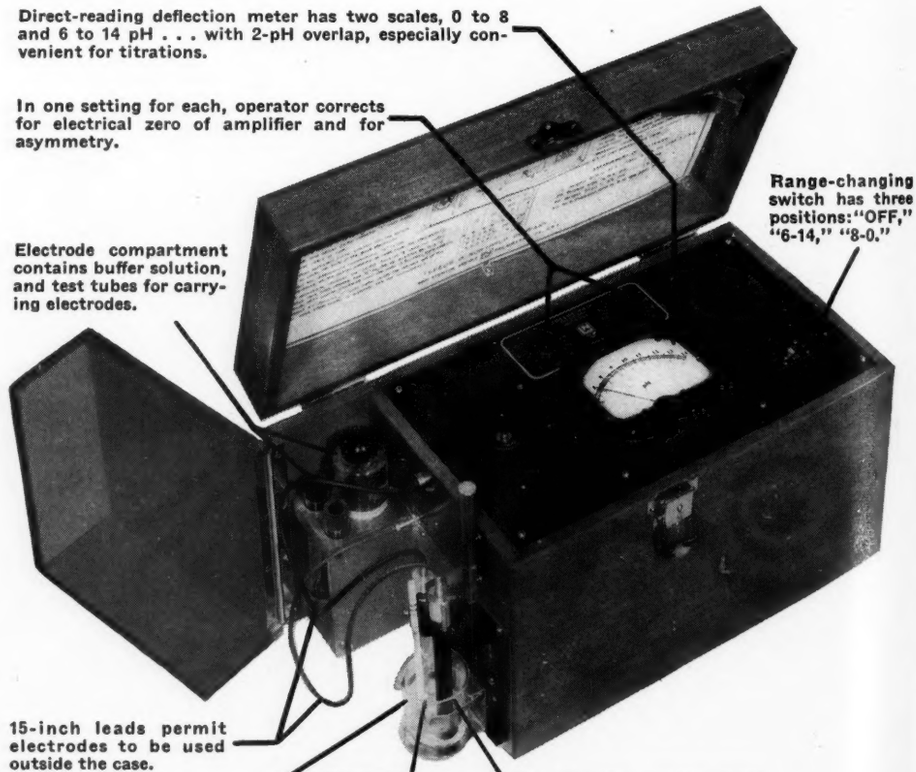
pH CHECKED RELIABLY IN HOT, HUMID WEATHER

Will you be making tests of pH this summer? Using a glass-electrode set-up during hot, humid weather? And are you wondering how to overcome the leaky, erratic behavior to which such instruments may succumb?

If that's your problem, or even part of it, the worker shown above may be pointing to an answer. For he's working in a small lab which opens directly off a greenhouse. High temperature and high humidity are, of course, fairly constant. And yet, this plant-scientist keeps one of our pH Indicators exposed continuously to this "bad" pH weather. It works perfectly, without a trace of leakage, as indeed it should, for it's designed for ambient temperature as high at 85 F and relative humidity to 95.

The instrument shown above is our Universal pH Indicator, for use with any Nernst equation electrode. We also make the Glass-Electrode Indicator, shown in the detailed illustration below, and recommended for all uses to which this electrode applies. The Indicator has the same "sticky-weather" characteristics as the other. Its ability to work in extremely unfavorable ambient conditions is explained by the thoroughgoing way in which the Indicator is guarded against leakage effects. Other characteristics of the Indicator include manual temperature compensator, and factory-filled electrodes. Instrument has 2 scales; one is 0-8 pH and the other 6-14. The 2-pH overlap is particularly convenient for titrations. The Indicator's limit of error is 0.1 pH.

The Indicator is truly portable—has a number of "anti-rattling" devices to hold all parts snug during transit; there's a close-fitting cover-plate for the batteries, and a separate battery compartment so that sulfate can't get at the measuring circuit. The Indicator's catalog number is 7662-A1; price $160.00, complete with electrodes, chemicals, supplies and directions.


Direct-reading deflection meter has two scales, 0 to 8 and 6 to 14 pH . . . with 2-pH overlap, especially convenient for titrations.
In one setting for each, operator corrects for electrical zero of amplifier and for asymmetry.
Range-changing switch has three positions: "OFF," "6-14," "8-0."
Electrode compartment contains buffer solution, and test tubes for carrying electrodes.
15-inch leads permit electrodes to be used outside the case.
Standard 50-ml beaker is self-aligning; held firmly in place by metal clips.
Thermometer facilitates setting of temperature compensator.
Small, rugged, sealed glass electrode and factory-filled reference electrode, both of high stability . . . self-aligning to prevent breakage.

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LEEDS & NORTHRUP

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THE COVER

As FOOD INDUSTRIES has been pointing out for several months, an overall plan for food preservation is urgently needed. The United States may have to feed 70,000,000 people in England and other allied nations in addition to civilians and soldiers. To meet these requirements there must be a central planning agency to see that food processors get the materials and equipment that they need to do the job.

Washington apparently has come to recognize the importance of planning for food preservation, for it was announced last month that a central food administration would be established. Who will head this agency and what its program will be was not definitely known in late April. But whatever is done, any plan is better than no plan at all.

FOOD INDUSTRIES

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VOL. 14 NO. 5

MAY, 1942

FROZEN FOODS DIRECTORY

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List of companies packing frozen foods, with information on products frozen, containers used, freezing systems employed and output.

SPECIAL FEATURES

Army Food and Fighting Efficiency
By Lieut.-Col. Paul P. Logan 33

This is more than a discussion of Army food requirements and how the Army buys food. It is a challenge to business men.

Foods Need Guarding From Gas and Glass...*By Eric Hardy* 37

Precautions taken in England to protect food, and methods used for decontaminating gassed foods—just in case it happens here.

Near 'Ems Don't Count.....*By W. R. Van Meter* 39

A story of slips between the test tube and the production line. You'll find it not only interesting but highly informative.

DEHYDRATION

How Canada Dehydrates Foods.....*By H. C. Aitken* 41

Canada has done much research on dehydration and has developed and put into operation a dehydrater that gives good results.

What's Known Today About Dehydrating Vegetables—Part V.....*By W. V. Cruess and E. M. Mrak* 43

The last of a series of five excellent articles on dehydration. Taken together these constitute a dehydration handbook.

ENGINEERING

How To Convert Brewery To Industrial Alcohol Production
By G. T. Reich 46

Breweries can convert to production of an essential wartime commodity. And they can do it with equipment that is available.

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This Issue

Near 'Ems Don't Count

To learn what will work is often easier than to learn what will not. Hence, in the same spirit that we published information on packaging mistakes that are to be avoided, we are glad to publish on page 39 a record of near-successes that were not quite good enough to work.

FOOD INDUSTRIES would like to publish more of this sort of article, such as: "Substitutes for Coconut Oil That Were Not Right," "Closures That Weren't Quite Good Enough," "Good Processes That Failed," or "Wrong Places To Use Good Instruments." But who is to write them?

Brewers Can Convert

To convert anything but the machine shop of a food manufacturing plant to a war industry is difficult. But Dr. G. T. Reich shows on page 46 how a brewery can be converted to an industrial alcohol distillery. Of importance is the fact that he shows how it can be done without much equipment or metals that, like copper, are almost unobtainable.

When a war is to be won, legal restrictions on the distillation of ethyl alcohol are not part of our thinking. If the nation needs industrial alcohol, it can also be made in breweries. If the law interferes, then let the existing law be changed!

A Good Story Ends

With this number, the series of articles by Cruess and Mrak on dehydrating vegetables, which began last January, is concluded. In this final article (page 43), matters of storage, protection from insect infestation, packaging, "refreshing" or "reconstituting," cooking and laboratory examination of products are discussed.

Taken together, these five articles constitute a manual on vegetable dehydration that should be in the hands of every dehydrator. So the series will be made available, with other articles on dehydration, in the form of reprints, at small cost.

The Meat's Inside

On page 51 you will find a curve and statistics charting the trend in frozen food production. While this is information you won't find anywhere else, it's not the most important part of the Frozen Foods Directory. Look beyond the title page to the multitude of facts in the table itself. From the column headed "Container", for example, you can learn much about packages for frozen foods. The same idea holds for the columns "Products" and "System". Incidentally, this information is direct from the companies doing the freezing.

Coming

Poultry Packers Panned

Vera Megowen specializes in tasty chicken at her tea room in Evanston, Ill. But she had to fight with poultry packers to get the quality of poultry needed to please her customers. Yet she did not ask for anything more than the experienced housewife demands. In a future article Mrs. Megowen will tell you what's wrong with some poultry packers. And this viewpoint of a critical buyer of a processed food will be an effective stimulant to all in the food industries interested in doing a first-rate job. It will do you good to take a look at your product through Mrs. Megowen's glasses.

All's Well That's Oiled Well

With new equipment almost impossible to get and even repair parts hard to come by, food manufacturers must take every possible step to keep existing equipment operating and at high efficiency.

One absolute necessity in the program is adequate lubrication of moving machine parts. And one way to assure adequate lubrication is through the use of centralized automatic pressure lubrication systems. So, in a forthcoming issue, FOOD INDUSTRIES will tell, by picture and text, how these lubricating systems are proving of service throughout the food industries.

So You Need A Lift?

In efficient food plants, as in other industries, the heavy lifting is done with hoists. But to select the right type of hoist for the job requires some knowledge of hoists and their operation. Such information will be presented in a article coming soon on the things that should be kept in mind when selecting an electric hoist. While this is written primarily for canning plant operators, the principles covered apply also in other food industries. The author is C. E. Schirmer, chief engineer of a company which manufactures hoisting equipment.

Withdraw Those Deposits

In dairying, unlike in banking, deposits are a nuisance. The milk or milk products plant operator tries his best to avoid the adherence of deposits or films on the plant equipment and piping. But this is not enough. Deposits can be minimized. But a daily routine, designed to remove such deposits as form, must be followed if the milk plant operator is to avoid high bacteria counts, off-flavors and other penalties.

What to do about all this will be told in an early issue by Lewis Shere, vice-president of Diversey Corp.

McGraw-Hill Publishing Company, Inc., James H. McGraw, Founder and Honorary Chairman. Publication Office: 99-129 North Broadway, Albany, N. Y., Editorial and Executive Offices: 330 West 42nd Street, New York.

Branch Offices: 520 North Michigan Ave., Chicago; 68 Post St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

JAMES H. McGRAW, Jr., President; HOWARD EHRLICH, Executive Vice-President; MASON BRITTON, Vice-Chairman; B. R. PUTNAM, Treasurer; JOSEPH A. GERARDI, Secretary and J. E. BLACKBURN, Jr., Director of Circulation.

A McGRAW-HILL PUBLICATION

Published monthly; price 35c a copy. Allow at least ten days for a change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York, N. Y. Subscription rates: United States and possessions, Mexico, Central and South American countries, $3 a year, $4 for two years, $5 for three years. Canada, $3.50 a year; $5 for two years; $6 for three years (payable in Canadian or U. S. funds). Great Britain and British possessions, 30 shillings for one year, 60 shillings for three years. All other countries, $5 a year, $10 for three years. Entered as second-class matter Aug. 17, 1936, at Post Office, Albany, N. Y., under the act of March 3, 1879. Cable address: "McGrawhill, N. Y." Member of A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index. Copyright, 1942, by McGraw-Hill Publishing Company, Inc.

FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor

MAY, 1942

Any Plan Is Better Than No Plan

TRIAL balloons, sent up in early April, indicate that somewhere in official Washington there is, at long last, a growing appreciation of the food needs of the times. These inspired rumors try to suggest that the food processing industry is demanding a food administration or a food control board, which is the customary political device for evading responsibility should the proposed venture turn sour.

Another rumor, also suggestive of a trial balloon, is the story that nobody in Washington ever dreamed of the possible magnitude of Lease-Lend food demands on the United States. Let's take time out to examine that one. If this is a reflection of the Washington viewpoint, it must stem from the inner circle of the government, those nameless persons who mysteriously seem to control what goes on in Washington. For not only has FOOD INDUSTRIES been pointing out the growing size of the task in terms of people to be fed (at least 70,000,000 persons above our normal population), but since April, 1941, I have personally called on a large number of officials and explained orally the complexities of the problem in far greater detail than would be possible on the printed page. The partial list includes:

Frederick V. Waugh, Bureau of Agricultural Economics;
M. L. Wilson, Federal Security Agency;
George Livingston, then of OPM;
M. Clifford Townsend, Agricultural Defense Relations;
Paul Appleby, Under Secretary of Agriculture;
David Meeker, Agricultural Defense Relations;
Douglas MacKeachie, then of OPM;
Wayne Coy, Office of Emergency Management;
Roy Hendrickson, Agricultural Marketing Administrator;
R. M. Evans, Agricultural Adjustment Administrator;
Claude R. Wickard, Secretary of Agriculture;
Carl Hamilton, Assistant to the Secretary of Agriculture;
Donald M. Nelson, then of SPAB;
Lessing Rosenwald, Conservation Branch, WPB;
Harvey Anderson, Conservation Branch, WPB;
James Knowlson, Industry Operations, WPB;
Douglas Townson, Food Branch, WPB;
Amory Houghton, Industry Operations, WPB.

In addition to the foregoing list there were many more who, at the time, occupied staff positions, or have since left the scene.

The explanations to Drs. Waugh and Wilson were given at the time the program of the National Nutrition Conference for Defense was being prepared, about April 8, 1941. When the agenda of the conference was in preparation, my protests that calories—just plain food—would be far more important than vitamins in 1943-1944, that we should also begin to study the problems of food preservation at once, were politely ignored, apparently because of previous orders from the White House. (Vitamins were to win the war, yet food rationing is now starting.) With these two exceptions, everyone in official Washington with whom I have talked had appeared to be convinced, at that time, of the needs of the times and of the need for a comprehensive plan for food preservation and supply in wartime. Therefore, let it not be said that they have been deprived of a pessimistic view of the situation.

A third aspect of the trial balloons is the rumor that Milo Perkins is to be made food administrator, a rumor that has not aroused much discernible enthusiasm outside of New Deal Washington.

Other rumors have it that Clarence Francis would be made food administrator—a much more happy selection and one that anyone in or out of the food processing industry could support.

From all this smoke, it would appear that there must be a fire somewhere. It is to be hoped that a decision will be reached soon. Any plan is better than no plan at all.

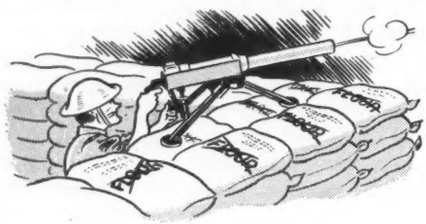
Whoever is appointed to bring order out of chaos must be a superior and forceful man. He must be endowed with complete authority and must be either powerful or persuasive enough to make Leon Henderson and Claude Wickard sing a harmonious duet, to persuade certain of the Allies and U. S. food processors to be realistic, and to command the respect of Congress, the WPB, the heads of the farmer organizations and the New Dealers.

Once the appropriate setup is created and given the proper authority, a comprehensive plan of action will be evolved. But until all divergent interests are directed to a common purpose, the inconsistencies and contradictions of the immediate past will persist. (April 24, 1942.)

EDITOR

The Talk of the Industry

● NON-IMPORTATION of silk, allocation of Nylon to parachutes, use of all burlap for sand bags and camouflage, and skimpiness of cotton bagging—things



like these place the flour miller behind the eight-ball for bolting cloth and bulk packages. There is ground for more than a mere suspicion that this war may have some unexpected and involuntary effects on our daily bread. But—more about this some other time.

● JOHN L. LEWIS, head of United Mine Workers of America, seeks to organize the dairy farmers of the Northeast. This is a very ominous move, of sufficient importance to have interested Congress. If he is permitted to continue his schemes of empire, we may see the beginnings of private armies in the United States, for there is no question about the vast amount of money that will be his to spend if he succeeds.

● BEST wisecrack from the Packing Conference was the definition of a nonessential item: Something the other fellow makes.

● SHORTAGES of almost everything are now so commonplace that it appears futile to single out many of them for detailed discussion.

For the benefit of those who must program their industrial operations long in advance it should, however, be pointed out that, in addition to the ordinary factors to be reckoned, there are some that are less understood. These are not so easy to evaluate as the more familiar ones. For example, Lease-Lend shipments of seed may have sudden and unanticipated results. One story has it that Russia has obtained huge quantities of onion seed with the result that this item is said to be a bit tight just now.

Another unanticipated factor for some will be the need for sharing our supplies with Latin American nations as well as with Britain and Russia. Tinplate and rubber come in this category. And a further complication will be the loss of ships and cargoes containing such supplies, or imports of equally needed materials. In case of ship shinkings the cargoes must be replaced, which may upset the best laid commercial plans, not only here but in other places as well.

As long as the United States has made vast commitments with friendly nonbelligerent Latin-American nations, we must do our utmost to make good on them. It is observable, however, that few North American food processors give sufficient heed to the needs of our friends, as well as allies. This is particularly true of synthetic rubber, for we must not only take care of our own military needs, but also Britain's (for Ceylon's 100,000-ton production probably has to be written off) as well as Canada's, and a good deal of South America's.

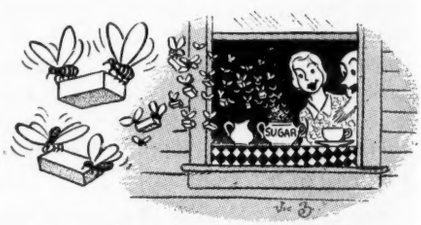
Unless future plans are based on all the factors there may be unpleasant surprises. War is a grim business at best, and this is the grimmest war mankind has ever known.

● "THE 'SOUR' SUGAR SITUATION," a title of a recent piece in a western farm publication, suggests the famous wisecrack of 1921, "Sugar will never taste as sweet again." The California farmers' principal gripe on sugar restriction is based on the idea that it will curtail the commercial canning of the fruit which they produce. They contend that sugar stored in the form of processed food is just as safe for future consumption as sugar stored in bags in a warehouse.

● ENROUTE from Washington to New York in daylight anyone can notice more freight cars on sidings than have been seen for 25 years. Is this the beginning of a freight congestion that will duplicate 1916–1918? Looks bad.

● SUGAR rationing is here. Retail purchases are limited to eight ounces per person per week. Watch breadstuffs consumption increase to compensate for this curtailment in sweeteners.

● HONEY is frequently advocated as a sweetening agent for use as a substitute for sucrose. For honey is a "natural" sugar, gathered by the dear little bees working tirelessly as they



collect the nectar from myriads of flowers—yep, billions of them. If we can't get sugar from the tropical islands we still can have our beet sugar, our domestic cane, our dextrose, our maple sugar and our honey—to say nothing of sorghum and high-conversion corn sirups. But to revert to honey, against which no man can object, ————.

It was therefore a bit of a surprise

to learn that the Sugar Section of the War Production Board has authorized dealers in sugar to sell bee keepers 80 percent of the sugar which they used month by month during the past year. The purpose of this sugar is to feed the bees and to permit the installation of imported bee colonies.

If it is necessary to feed sugar to bees to make honey to use to conserve sugar, just how much sugar is gained or lost by the process?

Food Technologists Convene June 15–17

Every person in the food industry who is facing technical and scarcity problems should plan to go to the convention of the Institute of Food Technologists, Nicollet Hotel, Minneapolis, June 15 to 17. The completed program, to be published in full in our June issue, is devoted entirely to wartime problems, such as substitutes for scarce materials used as ingredients; food packaging problems under today's scarcity conditions; dehydration of foods; foods for the Army; prevention of food stockpile deterioration.

Those who are not members of the Institute will be admitted on payment of a modest registration fee.

2,100,000 Tons of Food In Jeopardy

Reliable information has it that WPB is now at work on a new amendment to an existing "M" order, the results of which are likely to be far reaching. This order will further restrict the amount of steel that can be rolled into sheet steel. The very lowest restriction figure that has been considered is 300,000 tons. When and if the order actually emerges it may be even larger. That steel, it is conjectured, may be needed to help build the new oil pipeline from the southwest to Atlantic seaboard oil refineries. Or it may be needed for ships. But what will this steel order mean to the food industry? Plenty.

If that amount of steel should be taken out of the 2,750,000 tons of steel that went into food containers in 1941, it will mean that a huge amount of food must be packaged in some other way. As we figure it, if this amount comes out of packers' cans, it will mean that 2,100,000 tons of perishable foods won't have the necessary containers. That means this huge amount of food will not be sterilized by heat as a method of preservation.

The kind of container available determines the kind of process of preservation that may be used. Without rigid metal cans or glass containers, plus suitable closures, the method of heat sterilization cannot be used. This in turn places the burden on the next categories—freezing, dehydration, salting, smoking and chemicals. Freezing and dehydration preservation need moisture-tight packages—even airtight packages—all of which are none too plentiful today. Whether the amounts available will be adequate to compensate for the loss of 300,000 tons of steel remains to be calculated. Which is not to say that the industry has the equipment ready to process the extra amount of food by freezing or dehydration. It does not.

If the packaging problem cannot be safely solved in the foregoing brackets, then we must rely on the smoking or salting methods of food preservation that can utilize loose packages or wooden cooperage. Again, it is not known whether the cooperage industry can take up the burden.

It is hoped that Washington will figure it all out before taking the fatal step, or rationing of some kinds of food will take place in 1943.

Apologies

War upsets everything. If readers having specialized interests find that these pages are devoted largely to matters connected with food preservation and the war effort, please realize that it is the inevitable consequence of war.

Hors d'Oeuvres

• *The doughnut promotion boys are at it again. Now they are working with National Halloween Party Association and National Halloween Week Committee. Little danger of the doughnut business going into the hole.*

• It has been suggested that cigarette wrapping machines could be used to package dehydrated food. Not a bad idea. Then if the stuff tastes like hay you can at least smoke it.

• *If all the breweries were to convert to the manufacture of industrial alcohol, not only would there be no further scarcity of that commodity but there would be enough to pickle the Jipponese and preserve them for posterity in a harmless form.*

• "Protective Concealment" is the title of a new booklet issued by the OCD. At last obscurity pays dividends.

• *Dehydrating sauerkraut, someone has observed, would be the height of technological futility.*

• Without any rationing, people on pullman diners have materially reduced their consumption of sugar. Apparently the public's sweet tooth is beginning to bother its conscience.

• *It has been discovered at the University of Texas that passing an electric current through an onion in a direction opposite to its growth gives it the shape of a carrot. It would be more appropriate to give the onion a tear-drop design.*

• The anti-gray-hair vitamin, para-aminobenzoic acid (paba for short), not only restored the original color of the hair of two out of three of the men to whom it was administered but it showed other "rejuvenating" effects. It not only makes a man look younger but it enables him to live up to the promises of his appearance.

• *There will be 8 percent more turkeys for 1942 Thanksgiving. And we ought to be 800 percent more thankful that we're not in the shoes of the Japanese.*

• Professor Henderson of the dairy department of the University of Georgia has suggested the following three grades for cream: (1) Cream that an inspector would be willing to taste and swallow. (2) Cream that he would be willing to taste but not swallow. (3) Cream he would not be willing to taste.

• *In ancient Egypt, beer was used as a token to bind official negotiations. In those days a man proposed to a lady by taking her a gift of beer. But in these days he takes a couple of shots himself.*

• A high-frequency radio tube that originally was used to kill rice weevils has done much to take the bugs out of television and make it practical.

• *In China, fishermen drop a male carp into a brook on a string and the female carp sieze it and hang on tenaciously. Then the fisherman hauls in the whole bunch. Which is being a little too popular with the other sex.*

• In some ways the grapefruit is a spitting image of the orange. F. K. L.

Don't Send Boy To Do Man's Job

The horrors of another nervous breakdown are so much greater than the displeasure of the person who is denied access to our offices that, in a spirit of self-preservation, we have set aside one hour, once a week, to see those who think they want to get aboard the band wagon of vegetable dehydration. The situation in the offices of FOOD INDUSTRIES has reached the point where it is usually possible to know that a telephone caller is after easy knowledge of dehydration merely by the tone of his voice even before he makes known his universal request.

Just how bad it can be is indicated by the fact that on March 30 all our time but 15 minutes was devoted to this one subject. On March 31 we managed to do 30 minutes of work—all the rest of the working day was spent in talking to callers and the telephone. On April 1 it was nearly as bad, yet only one hour could be devoted to the job for which we are paid.

On April 2 the process started to repeat. But at this point the line was drawn. Hereafter only the mass discussions are permitted to non-food people.

Most exasperating are the folks who send a boy to do a man's job. People with only a high school education or less are unable to grasp the technical problems to be met. We positively will not stop to explain orally such matters as latent heat of evaporation, B.t.u., biochemical oxidation, the role of air velocity, enzyme inactivation, relative humidity, *et cetera*, to laymen who are not in the food business now. Anyone who expects to get any worthwhile information must be prepared with experience and the necessary technical education.

What Is Meant By Dehydration?

Countless inquiries at the offices of FOOD INDUSTRIES about "dehydration" reveal a lack of understanding of the term. People say "I want to go into dehydration. How do I do it?" Too often they have no idea of what they want to dehydrate, and much too often they are former automobile or tire dealers who, forced out of business, think that "dehydration" is an easy way to a new livelihood. "Dehydration," as they visualize it, is, alas, likely to be an easy way to develop one big headache.

Dehydration has two meanings, to our way of thinking: First, it is a unit operation of food engineering involving the removal of water from a food by evaporation from a solid or a liquid at temperatures usually far below the boiling point. Whether you choose to call it evaporation (as applied to apples), dessication, drying, sublimation, or what not, it is still the same unit operation—dehydration, *i.e.*, water removal, generally without boiling.

Second, it is a method of food preservation, for if a food is dried out to a sufficiently low moisture content, usually from 3 to 7 percent, it is impossible for molds, yeasts or bacteria to grow on it as long as it remains dry.

Dehydration as a preservative process does not protect a food from rodents or insects; only a proper package can do that.

And dehydration as a preservative process does not protect a food against chemical or biochemical deterioration; only proper preparatory treatment and packaging, based on the principles of food technology, can do that. Yet even this is not wholly solved.

To dry a food seems so easy that lay persons, lacking technical knowledge of the hazards involved, want to rush into the business. If this were not a period of war when every ounce of food must be conserved there could be no objection to anyone risking his money and wasting food in the venture.

While it is not difficult to dry out a food irrespective of the cost, it should be remembered that a successful operation involves eight steps in which dehydration is only one of them, yet all must be performed successfully—nay, perfectly—to produce a satisfactory product. These known steps are: (1) Choice of the right variety of raw material; (2) proper growth of the raw material; (3) harvest or slaughter at the proper time; (4) prompt preparation for dehydration (very important); (5) proper preparation (also very important); (6) proper dehydration; (7) proper packaging; (8) proper storage. Make a flop of any step and the resultant product is likely to be off grade or even unsalable.

Foods that are preserved by dehydration are many, including: fruits, vegetables, fish, meat, eggs, milk, meat extract, yeast, enzymes, coffee, fruit juices, soups, and even some prepared cake mixes. When one contemplates entry into "dehydration" he should consider what he wants to dehydrate and should realize that dehydration is another problem superimposed upon the technology of any of the foods to be so preserved..

How To Convert A Food Plant?

Do you have an idea, a well considered idea, on how to turn an existing food plant into one that can make anything needed for war? If so, write it up and send it to FOOD INDUSTRIES.

Do you have an idea of how to change a food plant from something nonessential to essential food production? Send it to F. I.

If you can produce ideas that are publishable you will materially aid the prosecution of the war—THE EDITORS.

Production Requirements Plan

Ever since January 1 the Production Requirements Plan, though little advertised, has been in operation. It is fully "effective" on July 1. Under PRP, each company's estimated requirements for three months ahead must be set forth on a special WPB form known as PD-25A (or PD-25X for businesses smaller than $100,000 per year). This form will also require listing your entire inventory of production supplies.

PD-25A is the big pink form about 25 pages long. It must be filed for your third-quarter production requirements before May 30. All allocations of production supplies on the critical list will be based on a summary of these reports.

Under PRP all the P orders are abolished. (See F. I., p. 40, Jan., 1942.)

Use a separate PD-25A or PD-25X for each product manufactured if your system of accounting sets up a separate inventory for each product.

ARMY FOOD AND FIGHTING EFFICIENCY*

By LIEUT.-COL. PAUL P. LOGAN
Subsistence Branch, Quartermaster Corps, U. S. Army.

These are fighting words. They challenge your effectiveness as a business man and as an American. Read them, think about them, then do what you can. Your Valley Forge is here!

I AM indeed honored by your invitation to participate in this program. The Quartermaster General, being unable to accept the kind invitation to be your guest, directed me to convey to you his greetings and his appreciation for the opportunity to present to you information concerning the work of the Quartermaster Corps in providing the Army's Number 1 requirement—Food.

You are meeting today during the most dangerous period of United States history. In less than four months of war, we have witnessed the rapid fall of fortifications and positions long deemed impregnable. We have seen cataclysmic destruction of lives and property in one fleeting hour. We have had thrust upon us complete and unprecedented revolution in industrial procedure. We have come to the unpleasant realization that America must extend her energies and resources with all possible speed and to the fullest extent to maintain the resisting power of our allies while we prepare ourselves—and them—for offensive war.

For many years our people, in considering the subject of armed protection, have heard only the word "Defense." They have learned that, having great strength in manpower and resources, we could—and would—*defend* our liberty, *defend* our standing among nations, *defend* our freedom of movement upon the high seas and *defend* the Western Hemisphere from aggression. But the word Defense, as interpreted in the public mind, has been a hundred percent different than was intended in the proclaimed policies. The Principle of the Offense is one of the basic principles of war—and no military student in this, or any other country, ever thought that a war or even a battle could be won if that principle were violated, and no sales or business executive ever thought he could be successful in a deal or in his career if he spent his time defending his position or countering the aggressive activities of his competitors. In recent years the technic of war has undergone radical changes, but the basic principles remain unchanged. Citizens who a year ago thought only in terms of defending our shore lines, are impatiently demanding that we promptly take the offensive. America has thus taken her first great stride toward victory.

The second great lesson is right now being rapidly learned, namely, that peacetime economy and wartime economy are as different as day and night. In the former, social rights of the individual and organizational privileges of the group predominate. In the latter, national welfare, or the right of the State, must govern the actions of all.

In modern concept, war is a titanic struggle between entire nations which strike one another with the full weight of their political, economic and military powers. It is characterized by the employment of all forms of force to the greatest possible extent and with the greatest possible speed. The cost of war, of which money is only one factor, will be felt and shared by all, regardless of what they think or do. Increased control by the State over economic life grows as military needs become more complex. Coordination on a national scale is necessary even if that action means more complete governmental control over industry, labor, capital and resources.

America will win this war, but the speed of the winning and the degree of destruction of our manpower and resources will, in large measure, depend upon the quickness with which we can

Harris & Ewing

Bones and surplus fat are removed from beef bought by the Army, saving about 30 percent in weight and considerably reducing the bulk. Then the beef is separated into three parts: (1) Meat for roasting and steaks, (2) meat for stewing and boiling, (3) meat chopped into hamburger. This method of handling meat will save, this year, shipping space amounting to the capacity of 20 ships.

* From an address to the Association of Advertising Executives, New York, March 31, 1942.

mobilize our entire economic, industrial, intellectual, moral and military forces. There must be no slackers in this war because every man, woman and child has automatically become part of the fighting line, and many not in uniforms may, in fact, be on actual battlefields. If you doubt that, ask the citizens of Honolulu.

Recently, it has been calculated that this war is being fought by teams of 17 people; that it takes 16 workers to keep one soldier in action. In our coal and iron mines, in our mills and factories, in our banks and business concerns, over our transportation and communication lines, 16 workers must produce without stint or stop in order that their team mate may pull the trigger and deliver their message to the enemy. If they fail, he will fail. If one member of the team drops out, even for a day, he has aided the enemy by contributing an irretrievable time loss—and he has crippled his other team mates. Obviously, the efforts of the entire team are halted temporarily if the man at the front becomes a battle casualty, or becomes physically incapacitated and thereby unable to function. Small wonder then that the Army gives such great attention to physical fitness. The greatest single factor in building and maintaining high spirit and morale in a fighting organization is the regular service of nourishing, palatable food.

Modern war, with its lightning speed and nerve-shattering machines, lays heavy toll upon the physical and nervous stamina of men. There is a most direct relationship between food and physical fitness. Not only must the quantity of food be adequate for men who are under the strain of war, but the variety must provide all the components of a properly balanced diet.

Men may have the courage and the will to fight, but without the right kind and quantity of food they rapidly lose strength and power of endurance. The average civilian not engaged in hard physical labor consumes 3,000 to 3,500 calories daily. In normal garrison life a soldier consumes 4,200. Under combat conditions his requirements are over 5,000. In the zone of action, the fighting man is under continuous nervous strain—an energy-consuming strain. He has to resist the elements of cold and heat, and sleep under adverse conditions. This consumes energy. He has to march in mud and dust, crawl through brush, spring from the ground and run at top speed, carry heavy loads of weapons and ammunition. He must exercise sufficient physical control to carefully aim and fire his weapon. And finally, when he reaches the enemy he must engage in personal physical combat with the understanding that the loser will probably be dead or wounded at the end of the fight. To do these things efficiently he must have an ample quantity of those vitamins which ward off fatigue, of the mineral salts essential to processes of metabolism, of good protein to rebuild his worn-out body cells, and of the energy-giving carbohydrates and fats. Good health and good food are as essential to a fighting man as ammunition is to a gun. There is indeed a most direct relationship between food and fighting efficiency.

The daily allowance of food for three meals is called a ration. A soldier consumes over 5 lb. of food a day. The shipping weight is over 6 lb. To feed an Army of 3½ million men, 20 million pounds of food must daily be purchased, shipped, tabulated and issued. Every pound must be inspected for quality and condition. The issue involves distribution in correct amounts to 15,000 Army kitchens in 300 camps, scattered through every State in the Union and many overseas stations. This represents an increase over our peacetime operation of 200 percent in the number of camps, of 500 percent in the number of overseas stations and 1,500 percent in personnel.

Providing subsistence to such an Army, particularly in the theater of operations, is a difficult problem and one that can be solved only by careful preplanning and unceasing supervision. From the standpoint of tonnage, number of transactions and dollar volume, it is one of the Army's major procurement problems. The amount of food used by the Army is not, however, a new or additional market. When a man joins the Army he brings his appetite with him. He does eat about 25 percent more in the Army than he did in civil life. During his first 90 days of service he gains about 7 lb. But this

Signal Corps, U. S. Army

The food research and development work of the Army is largely carried out in the Quartermaster Corps Subsistence Research Laboratory in Chicago. This laboratory examines and tests new products, new containers and new theories of food preservation. Here the research laboratory staff is having experimental foods for lunch.

increased consumption by 3½ million men causes less than one percent increase in American food production except for special items.

How Army Buys Food

Subsistence procurement is the responsibility of the Quartermaster Corps. It is centrally controlled by the Subsistence Branch, which is part of the Supply Division in the Office of The Quartermaster General. In addition to the administrative, fiscal and statistical sections, it includes separate functioning sections to cover all activities concerned with nonperishable items, perishable supplies, bakery activities and research and development.

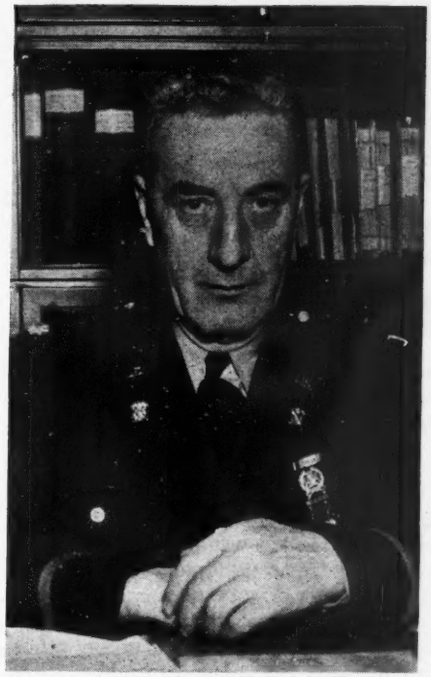
Nonperishable supplies are largely purchased by the central procurement depots—Jersey City, Chicago and San Francisco—neither of which overlaps the work of the other. Nine regional depots purchase a limited number of items for the camps they serve. Post quartermasters purchase, for resale to individuals, items which are not purchased by depots.

Army posts and regional depots carry a 30- to 45-day stock. Ports of embarkation carry limited stocks, but each is backed up by one or more inland depots from which supplies can be promptly delivered to the port. These stocks are completely balanced and are based upon menus prepared in the Subsistence office by nutritional specialists. We have shipped with certain outgoing forces as much as 180-day supplies of perfectly balanced rations, not one item of which needed refrigeration.

The Perishable Section handles the procurement of fresh fruits and vegetables, fresh fish, poultry, butter, eggs and cheese, and this month is starting the purchase of fresh meats. It operates a system of 30 market centers, strategically located as to markets and camps. A central market in Chicago handles the car-lot work. All the market centers are hooked up by teletype with the Chicago main center. Purchases are by direct negotiations. This business is now averaging five-and-one-half million dollars per month.

The Bakery Section of the Subsistence office is concerned with the designs of bakery equipment, both for garrison and field use. In collaboration with manufacturing companies, this section has designed and is now purchasing portable field bakery equipment, gasoline powered and heated, modern in every respect and as streamlined as the west wind. In consonance with latest nutritional thought, we are now using enriched flour. All overseas stations are now supplied with dry, activated yeast which requires no refrigeration. Civilian bakery specialists are promptly sent to any post where bread quality falls below standard, to analyze the difficulty and assist the Army bakers in solving the problem. We are proud of the quality of Army bread.

This Section has the additional function of menu work. Dietitians and nutritional specialists are employed to assist experienced Army officers in the preparation of monthly master menus, as guides to the field, and menus for special purposes. Our menu No. 1 is for tropical use, No. 2 is for arctic use—both are nutritionally balanced and include only nonperishable items. The most recent work of this group was a special menu for alien enemies who are to be interned.



U. S. Army Signal Corps

LIEUT.-COL. PAUL P. LOGAN

New Ideas Tested

The research and development work is headed up in the Subsistence office but largely carried out in the Quartermaster Corps Subsistence Research Laboratory in Chicago. The laboratory examines and tests new products, new containers and new theories of food preservation. It conducts studies on, and prepares samples of, rations required for special purposes. It gives continuous attention to ways and means of reducing the weight and the space displaced by rations. This is perhaps the most interesting of all subsistence work and can best be described by a few examples.

Boneless Beef Saves 20 Ships

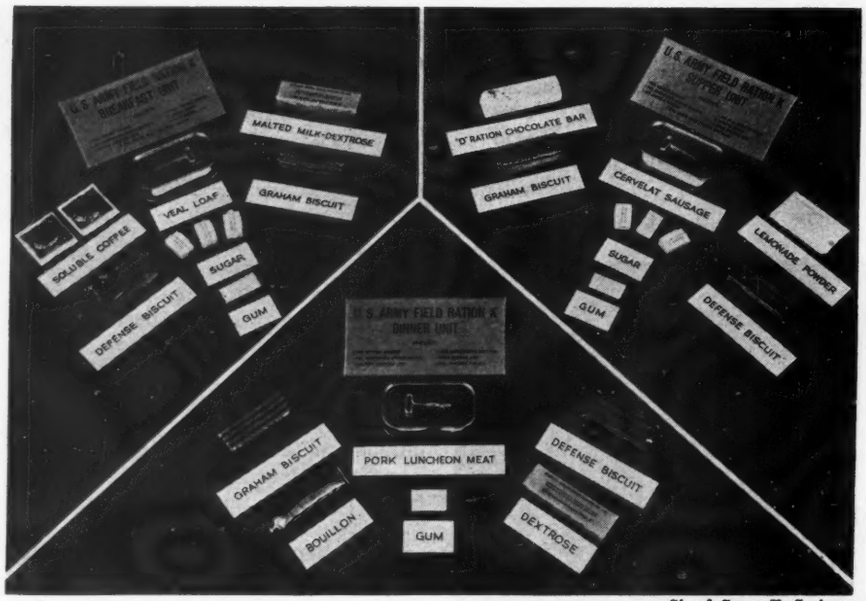
In 1934 a study was started on boneless beef. A style of cutting was developed which is now in use. It leaves the bones and surplus fat—amounting to some 30 percent of the weight and having some commercial but no battlefield value—in the hands of the packer. The beef is separated into three parts: No. 1, for roasting and steaks; No. 2, stewing and boiling; No. 3, chopped into hamburger. Each is packed into 50-lb. boxes and frozen solid. This is ideal for distribution and field-kitchen use. A ton can be stored in 35 cu. ft. whereas a ton of carcass beef occupies over 100 cu. ft. We are now buying about 3,000,000 lb. per week. This development will in 1942 save 66 million pounds of shipping weight and 8⅓ million cubic feet of shipping space. That weight would fill 2,500 refrigerator cars and the space amounts to the cargo capacity of 20 ships.

The reserve ration used during the World War consisted of corned beef, pork and beans, and hard bread—the latter packed in handmade square cans. Development work on this has produced a well-balanced reserve ration now called the Type C ration, consisting of three 12-oz. cans of meat and three similar sized cans, each containing biscuits, soluble coffee, sugar and hard candy. The hard bread is a new and very nutritious biscuit developed in our laboratory and replaces the old-time "hard tack." This ration is carried by the individual for use when normal food supplies cannot be issued. To date we have purchased 15 million Type C rations.

An emergency ration known as Type D is now in use. It is a chocolate bar, stabilized to a high melting point by the inclusion of oat flour. No attempt was made to balance the nutritional components in this ration, but it was made somewhat more nutritious by the inclusion of vitamin B_1. It is carried by the soldier for use in a temporary emergency when all other sources of food fail.

K Ration Passes Test

A new ration, given the working title of "Parachute" and now identified as the Type K ration was recently given a field test at Fort Benning and is now being tested by mountain infantry. The test reports are very pleasing, and this ration will no doubt be adopted. It consists of 12 items of food, weighs 32 oz., contains 3,700 calories and is well balanced. It fits well into the parachute uniform and can be easily stowed on airplanes or life boats, and will keep indefinitely. Men have gone through very strenuous day and night field operations for four consecutive days without loss of physical efficiency or without dissatisfaction with respect to the food. This ration will undoubtedly prove to be highly satisfactory for field use under certain conditions.



Signal Corps, U. S. Army

The new Type K ration, or "Parachute" ration, which recently proved its value in field tests at Fort Benning. It consists of breakfast, dinner and supper units and contains 12 items of food. It is a well-balanced ration and supplies 3,700 calories. It weighs only 32 oz.

These and literally hundreds of other problems are part of research and development work. Those particularly important at this moment have to do with the further reduction of space and weight requirements by the use of dehydrated foods, and the finding of satisfactory packages made as far as possible from nonstrategic or critical materials. Either of these subjects is a whole story by itself. I am glad to report that great headway has been made and satisfactory results are in sight in both cases.

Your House Is On Fire

A little while ago I stated that we at this moment are in the most dangerous period of our history.

Gentlemen, your own individual house is on fire and all your loved ones are trapped inside. Your factories and warehouses are on fire and everything you have striven for through your entire life will be consumed in the conflagration if it isn't stopped. The time to go into action is now, today.

500,000 Items Needed— See If You Can Supply One

First and foremost is the urgent need for the rapid production of war material. A survey should be made by the head of every business organization to determine whether his plant is producing to its utmost capacity those things which are essential to battlefield use. If normal business has been curtailed, plant management should not wait for someone in Washington to tell them what to do. If plants which have processed or distributed foods find that they are now on a half-time production basis, an effort should be made to engage in the production of one or more items of needed war material. If there is a single part that goes to make up an airplane or an antiaircraft gun or an ammunition shell or a gas mask or a piece of soldier equipment or any other item which that plant can make either as a prime contractor or as a subcontractor, the management should secure necessary data, make plant changes and get into production with all haste. Including the various component parts of assembled items, the Army has over half a million items on its shopping list. Every factory should be working overtime to produce every ounce of such material. The Contract Service Section, Facilities Branch, Office of The Under Secretary of War, can give information on the subject of plant conversion.

Don't Chisel — Cooperate

The second problem is the conservation of essential war materials, particularly the strategic and critical items. Instead of trying to scheme or plan ways of obtaining this precious material to retain a "business as usual status," every effort should be made to discontinue the use of such materials for all other than war purposes. The item and the quantity saved may in some instances seem quite small, but remember that enough brass has been saved this year to make one million artillery shell cases by using substitutes for brass in shoe eyelets. The Quartermaster Corps has for some time been using non-strategic materials wherever possible. For example, we are now making most of our Field Ranges from enameled steel instead of aluminum for that purpose.

Everyone's Job

The third problem is to assure that every member of the organization is contributing, to the very utmost of his ability, to the war effort. Every man in every company, from the general manager to the janitor, should be imbued with the knowledge and understanding that he is no longer working for money. He is working for his very life—and what is more precious—for the freedom of men and women and children all over the world, today and for centuries to come.

Knock Down the Fifth Column

Let no man underestimate the enemy. His every war move to date has been carefully planned and methodically executed. In Berlin sits the great Institute Geopolitik, which has planned carefully and thoroughly for the ultimate destruction of democracy and if those plans are carried through, the destruction of human freedom will be as methodically executed as any other war move has been. Part of this enemy planning has been for the destruction of political unity by the infiltration of fifth columnists throughout our country. Every American should be schooled to observe and prompted to report to proper authority any subversive or fifth column activity.

Let no man underestimate his own ability. His contribution may be a thousand times more important than he realizes. We can't all be Douglas MacArthurs or Donald Nelsons, but we can all be sure that our own individual day-by-day efforts from now on are vital to the success of our armed forces, and oftentimes things which seem trivial are really very important. Remember that an automobile can be stopped, the bearings burned out, and a mile of city traffic blocked by the gasoline attendant who fails to reseat the oil plug on the bottom of the car.

Your Valley Forge Is Here

Gentlemen, you are all red-blooded Americans. Through your veins runs the same kind of blood that ran from bleeding feet into the snows of Valley Forge. Those men led by General Washington asked only for the necessary ammunition and for a half chance to get at the enemy. What they did with that ammunition and that half chance is today attested by the presence of 130 million free men and women in our beautiful land. Today our armed forces are asking for the same thing and over the face of the world 500 million determined people are looking to you for the same half chance to get at the enemy. Gentlemen, your Valley Forge is here.

FOODS NEED GUARDING FROM GAS AND GLASS

By ERIC HARDY
Liverpool, England

Air raids may ruin foods by filling them with flying glass particles; or, if gas is used, food may be contaminated by it and rendered unfit for consumption. Precautions taken in England to protect food and methods used for decontaminating gassed foods are discussed in this article

FOOD supplies are faced with two dangers during air raids. One is contamination from poison "gas," requiring subsequent decontamination, as has been proved possible with meat in special decontamination depots in London. The other is contamination from minute pieces of broken glass scattered by the blast from falling high explosives and land mines.

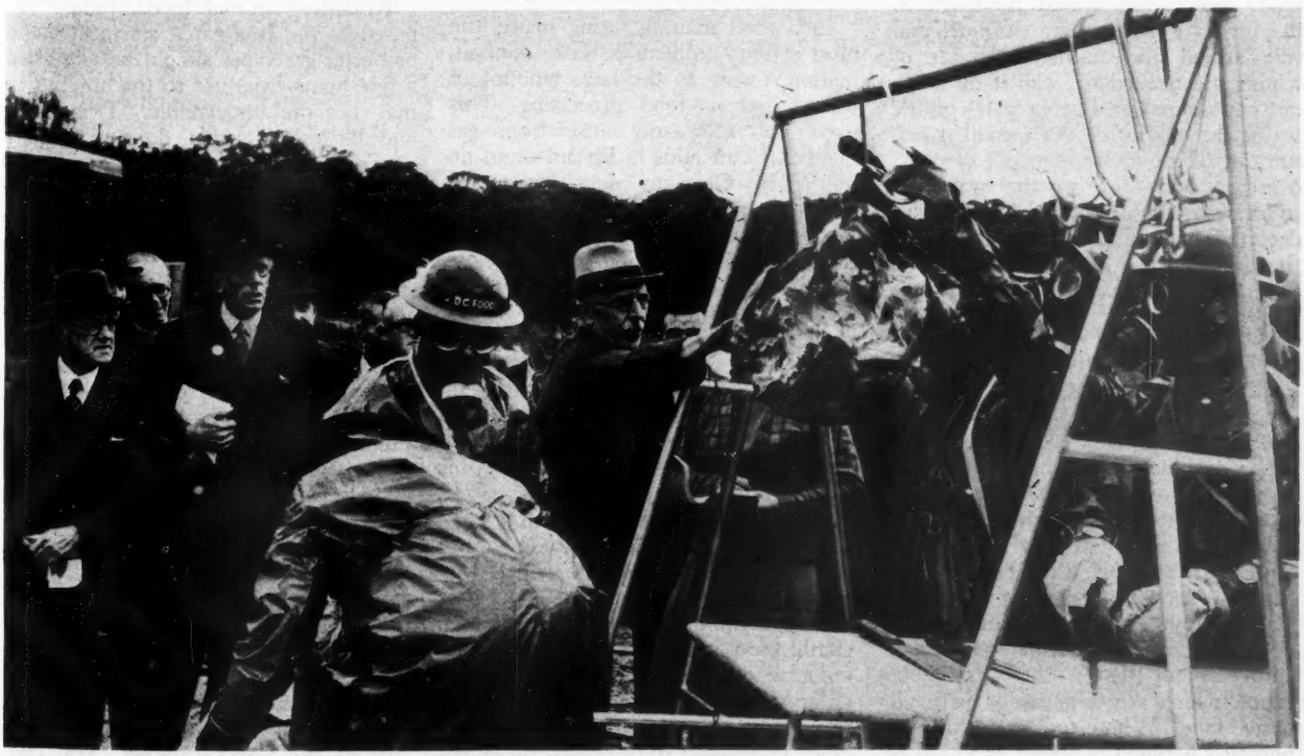
Contamination with glass is often more dangerous than may be thought, and in the big raids in England it was shown that glass fragments were dispersed with such force from the blast of an explosive that they could penetrate the average tin container of canned foods.

Air raids also present a problem as to what extent damaged foodstuffs can be salvaged from warehouses and stores burned in air raids, and to what extent they can be utilized. For instance, it was found that a store of figs, damaged too much by a fire raid and by the water used by the fire fighters, and thus unsuitable for human consumption, was an excellent source of bait for rat traps.

Such bait is needed in the Ministry of Food's pest-control operations to protect reserves of foodstuffs stored in vacant cellars and other rooms in various parts of the country.

Protection From Gas

Much research has been done in Britain on the problem of protecting food stores from gas attacks, and one of the most important things learned is that it is far easier to protect food from gas than to decontaminate it. For instance, the chief ARP controller of an important English town recently gave the following instructions: Food should be kept in the original containers as long as possible, as these are generally airtight and therefore gasproof. All food should be kept under cover, small quantities in closed cupboards or refrigerators and large bulk stores in gasproof buildings. Tarpaulins and screens make efficient and gasproof covers, if properly used, when there is neither time nor material to erect a gasproof warehouse. Store and shop window displays should be reduced to a



British-Combine Photo

Decontamination squad practicing with meat supposedly splashed with liquid gas. The meat is aired and affected parts are cut away.

minimum, because in addition to the danger from gas bombs, food in the shop window is exposed to the danger of flying glass.

Glass Goes Everywhere

It is probably impossible to salvage many foodstuffs that have been embedded with glass fragments. Bomb blasts smash windows and other glass into amazingly small fragments which are dispersed in a freakish manner, and the risk of peritonitis from eating glass-contaminated food is grave. Glass fragments often enter closed cupboards and places which appear to be protected from the direct path of the flying glass, if the protection is not airtight. When a land mine came down near my office and blew in my windows, a piece of glass was discovered a few days later in the back pocket of a pair of trousers lying over a chair, and pieces of glass were embedded half an inch deep in the plaster of walls and in furniture.

Domestic food supplies should be stored in cupboards fitted with airtight closing doors, clamped fast, and a gas ventilator which allows the normal air supply but which can be used to seal the cupboard instantly upon a gas warning.

All canned foods, like cooked meats, canned soups, and preserved fruits, cannot become contaminated by any war gas liquid or vapor, provided they are in sealed tins; but should the tin itself be "splashed" with war gas (which isn't a true gas, by the way, but a suspension of fine drops of chemical fluid) every care should be taken in the use of a solvent like gasoline, and very skilled and trained methods of wiping are needed to swab it off without contaminating further parts of the tin or the cupboard. An unskilled person can rapidly disperse a spot of "gas" over his hands, the tin, the swab, and so on by trying to rub or lift it off. This decontamination should be done before the tin is opened and before any other food is exposed nearby.

Fats Absorb Gas

The fatty foodstuffs are the most difficult problem because of their affinity for the vesicant or lung irritating gases likely to be used. Such foods require special protection against even vapor gases. Even cooking fats in waxed cartons and butter or margarine in stout, greaseproof paper are not safe against liquid gas, although they have a good degree of protection against vapor gas. They should be made safe against liquid contamination by being placed in empty biscuit tins or other large metal boxes, which are then sealed with adhesive tape. Where such foodstuffs are normally handled or stored, it would be wise to have a reserve supply of large metal boxes and adhesive tape to use as gasproof containers in the event of an emergency.

The unopened milk bottle has a high degree of gas protection; but it is safer if a teacup or a tumbler is inverted over the neck.

Cereals and sugar retailed in closed paper bags are reasonably safe against vapor but quickly absorb liquid gas and should, therefore, be safeguarded by a reserve of tin containers. Glass jars have the danger from blasts, although when full the content reinforces the glass sides; and these have not proved so dangerous as we expected. It depends upon how near is the bomb. Acid-proof stoneware is, however, safer.

Although eggshells are porous, it is doubtful if gases could get through to contaminate the egg within; but both shell and tough lining membrane would have to be removed in decontamination after-treatment. Preserved eggs in their containers should be quite safe.

The meat problem from the butchers' point of view is perhaps the most vital. Contamination may be suspected by change of color, odor, or taste. A method of decontaminating meat damaged by vapor gassing has been devised by a system of "airing" the meat, but liquid gas contamination cannot be destroyed by simply washing off the meat or by cooking it, and often contaminated meat of this sort will have to be destroyed.

Vegetables of high water content are likely to be contaminated by gases like phosgene, and will have to be destroyed.

Water May Be Contaminated

In a food manufacturing plant, the most serious problem is water contamination, owing to the large amount of water used in food processing. This need not necessarily arise from gas bombs. In air raids in Britain—and no doubt in Germany too—danger of water contamination has been found to lie also in the bomb damage to water mains and sewers which often lie close to one another in the ground. If sewage gets into the fractured water mains, serious risks of typhoid and other diseases arise. The chlorination method is still one of the easiest methods of water purification; and one of the ways of discovering the mildest forms of sewage contamination is to examine water samples under the microscope for the presence of those species of paramecium, bacteria and nematode worms and other microscopic life which live only in brackish water.

The commonest methods of water sterilization consist of adding gaseous chlorine or compounds of "available" chlorine like the hypochlorites of sodium and calcium. Other methods include ionic silver sterilization and excess lime treatment. For complete sterilization, a residue of 0.1 to 0.2 parts of chlorine per million parts of water is necessary in addition to the "chlorine demand" of the water; that is, the amount the water will absorb in 20 minutes. This small residue is tasteless and harmless. An even greater sterilization residue can be carried without affecting the taste by the "chloramine" process, which adds both chlorine and ammonia to the water to form chloramines.

Water slowly hydrolyses and destroys mustard gas and Lewisite, but the destruction of these gases is more rapid by oxidizing agents containing available chlorine like hypochlorites or chloramines, so that the same methods of sterilization against sewage contamination and bacteria can be used against "gas" contamination. Although arsenic "gas" may be destroyed, the arsenic may enter the water supply; but this can quickly be detected by routine water analysis tests practiced at every waterworks laboratory.

After a big raid when water mains have been fractured by bombs, no water main should be put into service until it has been resterilized by passing a strong chlorine solution through the main until residual chlorine is detected at the farther end. The main then stands for several hours with this strong chlorine solution in it before being washed out. When normal water main distribution breaks down under heavy bombing, small portable purification outfits—specially devised for the job over here—can produce a safe supply of water for human consumption from the contaminated places.

Regarding animal foods, fodder exposed to the true gases, arsenical soaps or blister gas vapor should be safe after a few hours exposure to the air; but it may become unpalatable. True gases and blister gas vapor do not contain water. But there is a danger of poisoning by Lewisite and the film left by the liquid blister gases.

Stores Should Be Dispersed

Finally, I would point out to food merchants that for the greatest safety from air raid fires, stores should be dispersed over as wide an area as possible. Stores which are scattered through many warehouses in many towns may cause inconveniences of transport, but in the case of a sudden big blitz upon a town, you do not lose all your stock at once. It took some business houses a long time to learn that in Britain. Otherwise bulk storing in rural places away from the towns, ports and military targets is the best.

In wartime, bigger stores of food are carried by food plants. This means increased pest trouble from rats, weevils and so on, and blackout increases ventilation and insect troubles. Pest control is an essential part of wartime food industry.

NEAR 'EMS DON'T COUNT

By W. R. VAN METER
Kingston Cake Co., Kingston, Pa.

Here is a story of good ideas gone wrong — of slips between the test tube and the production line. You who have the genius, the courage, to try new things will find comfort in every paragraph. And you'll find a lot of technical information, too.

MORE often than not the literature of food technology, of any technology, is a chronicle of triumphs. Success follows hard upon the experiment. As in the old stories, virtue is always abundantly rewarded and honest effort results in patents, or at least in some small token of esteem from the boss.

Actually, in the working laboratory of the industrial plant, such is not the case. A fair number of bright ideas flop between the test-tube stage and the production line. For one reason or another they fail, and are summarily buried on the plant's Boot Hill, and no man keepeth the memory of the failures green.

What follows here, therefore, is in the nature of the dropping of a tear, the fetching of a sigh and a glance turned backward, for the writer would recall his own share of good ideas that were not quite good enough.

A group of these ideas centered around ways and means of preserving the freshness of baked products, such as cake, between the time of baking and the time they reached the consumer.

Cake Frozen, Canned

Using solid carbon dioxide (dry ice) as a freezing agent, wrapped samples of cake taken from regular production were frozen solid and then stored in boxes refrigerated with more dry ice. It was found that cake could be held for several weeks in this way and when thawed out was practically fresh to the taste. The effect of freezing on icings, however, was quite another story. Fondant and marshmallow icings were made very "grainy" and in some cases broken down by the treatment. As a general thing, none of the icings was benefited by freezing, and whereas the cake had the appearance and taste of being fresher than its age, the reverse was true with icings. Development of staleness once the cake was removed from the refrigerated boxes proceeded at approximately its normal rate. The expense of freezing the cake and keeping it frozen, however, was much greater than the actual value of the cake warranted.

Cakes were also stored in sealed jars filled with carbon dioxide gas. An unexpected lengthening of the freshness period was observed in these CO_2 cakes. The apparatus used was not such as to insure much carbon dioxide pressure within the container. Samples of cake were placed in large jars, a lump of dry ice put in, a tight-fitting lid having a vent hole in it screwed onto the jar and the jar placed upright so that the vent was at the top. Then, as soon as carbon dioxide issued from the vent hole, and while a small lump of dry ice still remained in the jar, the vent was sealed off.

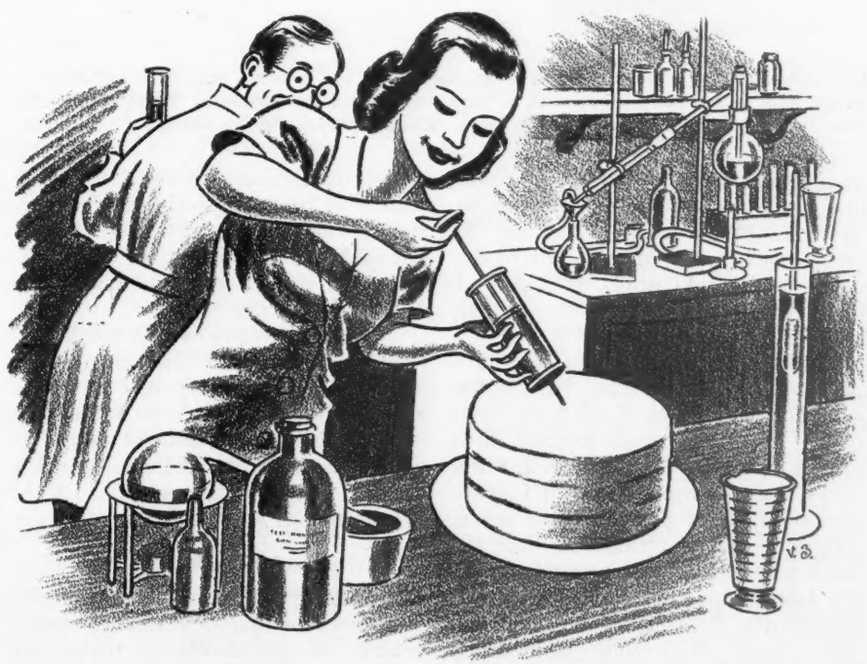
Crude as this method was, the freshness of cake taken from the jars after three or four weeks storage was surprising. Possibly the fact that the containers prevented the escape of any moisture from the cake and the fact that the slight pressure of carbon dioxide inhibited mold growth were responsible for this freshness. In most cases, no off-flavors were noticed on tasting these cakes. At any rate, interesting as it appeared, the experiment was dropped, because again the treatment was far too expensive for the value of the goods to be protected.

Since, from a practical angle, loss of freshness in a cake is a function of loss of moisture from the cake, it was decided to see what could be done in the way of actually adding moisture to the cake after it came from the oven.

Cakes Get the Needle

First tried was passing the cakes through a fine water spray. After the spray bath, the cakes were allowed to dry, then were iced and wrapped. The hitch here was in proper regulation of the spray guns. The least bit too much water caused a sogginess that ruined the cake and broke down the icing within a few hours after packaging.

Following the abandonment of this scheme, another trick was tried. It came within an ace of success and, even in failure, represented something of a



The idea of pushing moisture into cake sounded good. When tried in the laboratory it seemed, if anything, even finer. The cakes were injected with water by means of a hypodermic syringe.

triumph in the field of mechanical ingenuity. Since it had not been practicable to add moisture from the outside and let it work its way in, this time it was decided to reverse the process—push the water into the interior of the cake and then sit back while nature took its course. The idea sounded fine when mulled over in the back room.

And, by the way, it might be remarked here that every industrial laboratory should be equipped with a back room of some kind; a place where the boys can gather and let the old imaginations roam high, wide and handsome. Gather without interference from the front office, or any of the Gods of Red Tape, but just sit around and figure out what would happen, if . . . The venerable back room should be restored to its rightful place in the science of our time, and this writer, for one, will be very glad to do whatever he may to further such a movement, even to donating two prized prints of a pair of Back Roomers par excellence—Edison and Kettering.

The idea of pushing moisture into cake sounded good. When tried in the laboratory it seemed, if anything, even finer. The cakes were injected with minute amounts of water by means of a hypodermic syringe. Three or four injections of water per cake were made, staggering the injections so that the water would spread uniformly through the interior of the cake. The results were terrific. Injected cakes stayed fresh days longer than their noninjected brothers. The injected moisture remained inside the cake, not coming through the crust, and so causing a minimum of disturbance to any icing put on the cake.

There were, of course, mechanical difficulties to be overcome in handling this injection method. It happened, however, that at this time the engineering department of the plant was headed by one of the few near-genius types this writer has ever known—a man with a flair for invention, for devising the cheapest, the simplest and the most successful machine to do a given job.

Just when the first experimental machine was going nicely and testing work on the method was going full blast, the "bug" in the project appeared. It became evident as the cakes aged, as the moisture injected in the cake spread from the injection point, that a small nodule of firm crumb was left in the center of the cake. This nodule was not particularly hard by itself, but in the midst of the surrounding softer texture cake it was very noticeable when the cake was eaten.

Nothing was found which would prevent the formation of this lump, and be edible at the same time—the two horns of the dilemma which so often confronts the food technologists—and so, ingenious as the reasoning behind the method was, the experiment had to be written off as another of those things.

On taking the test tubes out of the oven, the sealed end of each tube was immediately struck with a hammer. There was a loud report, and the powdered starch within the tube became a porous, puffed white mass somewhat like tufts of cotton.

Starch Manipulated

Searching for a way to use starch as a moisture-retaining agent in cake batters, a series of experiments was undertaken to modify starch so that it would be suitable for the purpose. Several obstacles were in the way from the start. The characteristically "raw" taste of starch was one; another was the fact that when the taste was eliminated by cooking with water the percentage of starch was very small in relation to the amount of water, even when the resulting gel was entirely too stiff to be incorporated in the cake mix.

What was needed was a starch without the raw taste, a dry powdered product which could be added to the cake mix in large amounts without at the same time throwing the moisture content of the batter completely out of whack, and last of all a starch which would be completely gelatinized during the baking process.

Several means were tried to produce the desired alteration in the starch cell. A stream of starch was blown through a long, heated pipe. By the time it reached the far end of the pipe, some of the raw taste was gone, but that was all that happened, outside of the loss of considerable starch through burning. Next, starch was cooked with water until gelatinization was complete, then the cooked paste was run out in a sheet, dried thoroughly, ground to a powder and sifted. Baking tests showed the results to be interesting, but the expense of preparation was entirely too great.

Modifications of the same idea involved dehydration of the starch paste by freezing and also by forcing the paste through spinnerets into an acetone bath. Again, while the resulting product was interesting, the expense of such treatment was prohibitive.

About this time, the writer recalled reading some of Anderson's early work on the puffing of starches and cereal grains. It was decided to try the idea of "exploding" the starch to see whether this might not give the right product. On the face of it, the procedure would have been simpler and cheaper, for it involved no cooking with water, no drying, grinding and sifting of the starch.

For the experiment, the writer used heavy-walled test tubes wrapped with fine-mesh copper screening as protection against any flying glass. The tubes were filled about three-quarters full of starch, then sealed off and put into an oven at about 550 deg. F. for approximately ten minutes. On taking the tubes out of the oven, the sealed end of each tube was immediately struck with a hammer. There was a loud report, the copper screening bulged out, and the powdered starch within the tube became a porous, puffed white mass somewhat like tufts of cotton.

Obviously, the amount of puffed starch that could be made in this way was severely limited, but enough was obtained to run a couple of baking

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DEHYDRATION

Dehydration Methods Used in Canada • What's Known Today About Dehydrating Vegetables

How Canada Dehydrates Foods*

By H. C. AITKEN
Dominion Experimental Station, Kentville, Nova Scotia.

Vegetables and fruits are dehydrated into attractive, edible and highly nutritious products by means of dehydrating equipment and methods developed in the laboratories of Canada's Experimental Farms Service. Packaging in inert atmosphere used for some products

TO produce a dehydrated product that upon reconstitution is attractive, edible, and at the same time retains its maximum nutritive value, is the object of all dehydration research and production in Canada today. At the present time, five out of the eight plants capable of dehydrating vegetables are processing under government supervision. These plants are drying potatoes, turnips, carrots and cabbage. The plants, using tentative methods developed in the laboratories of the Experimental Farms Service, are in reality operating as pilot plants, in which it is possible for the government to modify the processes at any time. The five plants are distributed as follows: One in British Columbia, processing carrots; two in Ontario, processing cabbage and potatoes; and two in Nova Scotia, processing potatoes and turnips.

The type of dehydrator used is a hot-end-loading two-way-air-flow tunnel developed by C. C. Eidt of the Dominion Experimental Station, Kentville, Nova Scotia. This type of tunnel is capable of drying 10 tons of cabbage, 50 tons of potatoes, turnips or carrots or 60 tons of apples per 24 hours. Air is forced through the dehydrator by two fans, one at one end with a capacity of 40,000 cu. ft. per minute, the other at the opposite end with a capacity of 30,000 cu. ft. per minute. The speed of air flow over the product is about 1,200 lineal feet per minute in the secondary tunnel. Heat is supplied by steam radiators of the fin type and the temperature within the tunnel is automatically controlled. Dampers are installed in all the ducts so that air flow and therefore relative humidity are under absolute control at all times.

Prepared product is placed on trays, which are placed on trucks and the trucks transferred to the tunnel, where they are moved by stages through the 90-ft. of dehydrator. In the primary tunnel, the trucks move from a high temperature to a lower temperature, and passing into the secondary or finishing tunnel they move from a low temperature to a higher temperature. This two-way method of drying insures that the product is evenly dried on all parts of the trays. Actually, the primary tunnel is a parallel-current dryer, while the secondary tunnel is a counter-current dryer. In the finishing tunnel, where speed of drying is most influenced by the relative humidity, wet-and-dry-bulb thermometers are installed to insure adequate control and thereby maintain optimum and economical drying conditions at all times.

Apple Dehydrator Adapted to Vegetables

The present dehydrator was primarily developed for the manufacture of dehydrated apples but has proved excellent for vegetables and, with slight modifications, may be made still more efficient. The original dehydrators in Nova Scotia were either single or double tunnels with one fan, some of them holding as many as 12 trucks. These did not prove satisfactory because of low air velocities, unevenness and slowness of drying due to the single direction of air flow and because of the fact that the air was so wet near the cool end that the fresh trucks of fruit actually condensed moisture from the air.

Experimental work showed that six trucks or 24 lineal feet of fruit were sufficient to produce commercial saturation of the air. For this reason our tunnels hold six trucks in the primary tunnel and four or five trucks in the secondary or finishing tunnel.

We have found that hot-end loading is most satisfactory for products such as apples, potatoes, turnips, carrots and cabbage. Because these products give up their water easily, they approach the wet-bulb temperature, and the danger of scorching in the early stages of drying is eliminated. The secondary or finishing tunnel is usually operated at a temperature of 10 to 20 deg. F. below the temperature of the primary tunnel. As the product moves counter-current in the finishing tunnel it receives the driest air just before it is removed, when driest conditions are necessary to maintain the maximum drying rate.

Preprocessing Important

There still seems to be considerable controversy as to the advisability of preprocessing vegetables for drying. We in Canada are convinced that preprocessing, namely blanching, is necessary if products of suitable edibility, nutritive value and keeping quality are to be produced.

For example, preliminary investigations have shown that a product such as cabbage, which after drying shows peroxidase activity, will also show poorer quality after two months' storage than it does if peroxidase has been totally inactivated. For this and other reasons, all products under government supervision are either steam or water blanched before drying. At present potatoes and carrots are water blanched while turnips and cabbage are steam blanched.

It was thought at first that catalase inactivation would indicate sufficient blanching, but subsequent work has shown that peroxidase inactivation is the better indicator.

* Based on a paper presented at the Symposium on Dehydration, American Institute of Nutrition, April 1, 1942, at Boston, Mass.

Peculiar Enzyme Behavior

Here we have a curious thing occurring which requires further investigation. If, in the case of turnips, a blanch is given which is just sufficient to inactivate peroxidase, and these turnip pieces are held for 24 hours without drying, the material will again show marked enzyme activity. The same holds true for the dried product made from such blanched material. It would appear that the enzyme is shocked into inactivity and that after a certain period of time it recovers.

Packages for Dehydrated Vegetables

In Canada we use 5-gal. tins with press-in lids and solder-on caps to package dehydrated vegetables. Investigations have shown that inert atmospheres are, in the case of some products, a prime requisite for satisfactory storage. In a matter of weeks it is possible, in room-temperature storage, to note a definite deterioration in the quality of dehydrated carrots stored in an atmosphere of air as compared with those stored in an atmosphere of commercial nitrogen. For this reason all carrots, turnips and cabbage processed in Canada for government order are to be packed in tins in which the air has been replaced with nitrogen or carbon dioxide.

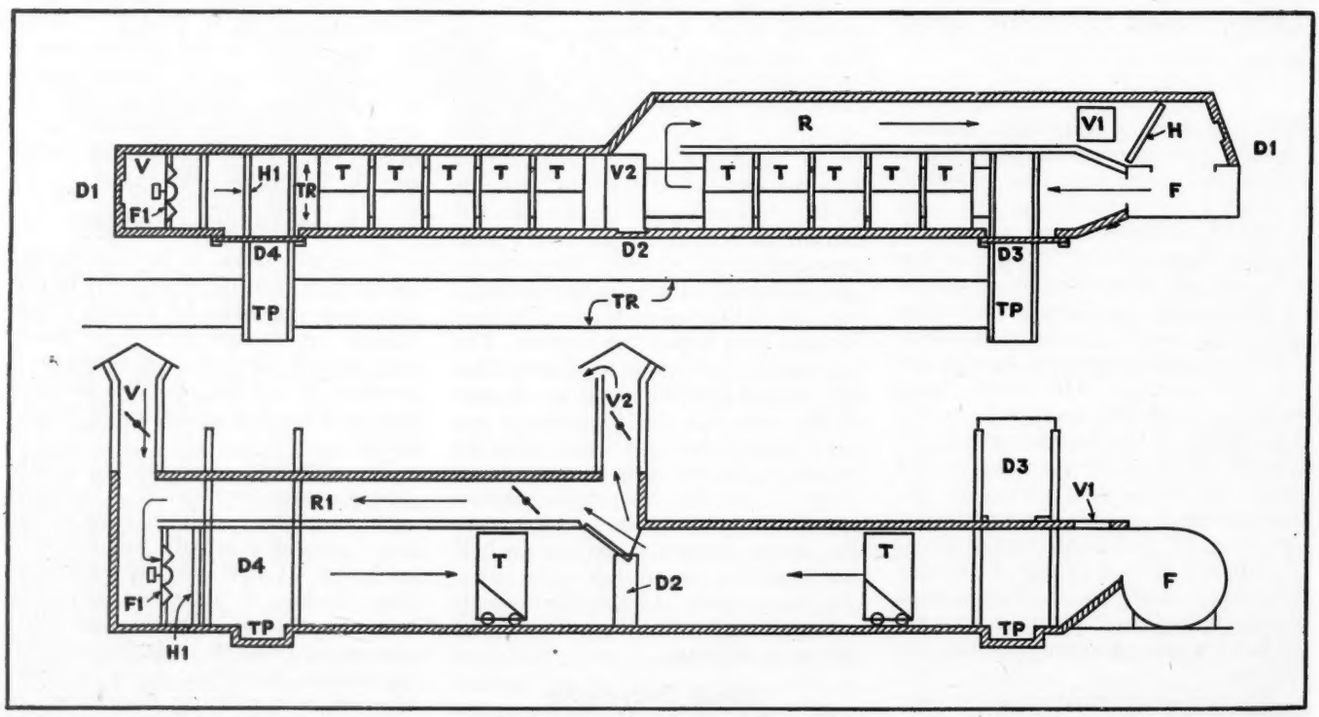
This pack at present is being effected by punching a small hole in the lid of the cans, placing the containers in a small (3-can) vacuum chamber, drawing a vacuum, releasing the vacuum with nitrogen and repeating the process. The cans are then removed and the holes closed with solder. This method, while not perfect, is proving quite satisfactory for the preliminary operations.

Early investigational work on dehydration was carried out chiefly at the Central Experimental Farm in Ottawa, and later at Ottawa; Summerland, British Columbia; and Kentville, Nova Scotia; but for the last ten years most of this work has been concentrated at the latter station under Mr. C. C. Eidt. At present practically all the fruit-and-vegetable-product facilities at Ottawa and Kentville are totally concerned with dehydration investigations.

At Kentville we have a new experimental dehydrator incorporating several innovations which it is hoped can be carried over into commercial design, thereby making a simplified installation, while at the same time increasing drying efficiency. Our experimental work at Kentville is divided into two phases, one covering the actual mechanical preparation and drying of the products, and the other the control work covering vitamin analyses, enzyme inactivation and so on.

In conclusion, to summarize:

1. An attractive, edible and nutritious product is the object of all dehydration work in Canada.
2. Dehydrators for vegetables in Canada are hot-end loading two-way-air-flow tunnels, in which high air velocities under positively controlled conditions are maintained.
3. All government-supervised dehydrated vegetables in Canada are blanched before drying.
4. The destruction of enzyme activity is a prerequisite for retention of quality.
5. Tin is as yet the only suitable material available in Canada for packages.
6. Some products require inert atmospheres for retention of quality.
7. Investigational work in Canada is concentrated at the Dominion Experimental Station, Kentville, Nova Scotia, and at the Central Experimental Farm, Ottawa, Ontario.



T, trucks; arrows indicate direction of air flow; R, air-return duct between the finishing chamber and fan; R1, air-return duct between the primary tunnel and the finishing chamber; F, conoidal fan to circulate 40,000 cu. ft. per minute in the primary chamber; F1, propeller-type fan to circulate 20,000 cu. ft. per minute in the finishing chamber; H and H1, heaters for primary and secondary ends of tunnel respectively; D, D1, D2, two-foot door to allow entrance to fans and heaters, and to make truck exchanges in the tunnels; D3 and D4, counterbalanced doors to allow intake and outtake of trucks; TP, transfer pits; V1, intake duct for use when the finishing chamber is not operating; V, intake duct; V2 outlet duct; TR, track; shading, insulation.

Schematic diagram of the two-way-air-flow dehydrator developed by the Canadian Department of Agriculture and used at various Dominion Experimental Stations for dehydrating vegetables and fruits. During the first part of the passage of the product through the tunnel, air flow is parallel to the product. In the second half, air flow is counter-current. This article explains the reason.

What's Known Today About Dehydrating Vegetables

By W. V. CRUESS

Professor of Fruit Technology and Chemist in the Agricultural Experiment Station, University of California, Berkeley, Calif., and

E. M. MRAK

Assistant Professor in Fruit Products and Assistant Mycologist in the Agricultural Experiment Station, University of California.

PART V—Directions for storing and fumigating dried vegetables. How to package them and how to control quality by laboratory tests. This concludes the series of articles by Cruess and Mrak.*

IT is customary to store dried fruits in bins or "sweat boxes" to permit equalization of the moisture before packing. Dried vegetables, however, should be dried to very low moisture content and there should be no insufficiently dried pieces; if any such are found at time of unloading the trays they should be sorted out and redried.

Insect damage is a very serious hazard in the storage of vegetables; much more so than with dried fruits. As the vegetables are free of living insects and insect eggs as they come from the dehydrater, they should be packaged at that time. If necessary, however, to store the dried products for several days or longer before packaging, tight fumigable rooms should be used. Such rooms can be constructed on the floor inside the factory building, using tongue-and-groove construction, ice-house doors and lining or painting the walls, ceiling and floors to render them gas-tight. Bins may be used, one for each variety of vegetable; or the vegetables may be placed in sweat boxes. The storage rooms should be fumigated thoroughly twice a month. The storage space should be dry. If the stored dried vegetables take up considerable moisture during rainy weather, they should be redried until crisp before packaging.

Insect Infestation—Dried vegetables are extremely attractive to insects, and during the period that vegetable dehydration was in vogue losses by insect infestation were very severe.

The Indian meal moth, *Plodia interpunctella L.*, is one of the most common insects attacking dried vegetables and dried fruits. It is a small moth in the adult stage. The moth lays eggs on the dried product, and these hatch in a short time to small, yellowish-white maggots. The maggots eat and excrete many times their weight of dried product, and in time reduce it to a disgusting mass of frass (excreta) and webbing.

The dried fruit beetle, *Carpophilus, hemipterus L.*, and the saw-toothed grain beetle, *Silvanus surinamensis L.*, are also usually very abundant and are voracious attackers of dried foods.

The fig moth, *Ephestia cautella Walk*, is a serious pest in dried fruit storage and packing plants and probably is not averse to infesting dried vegetables. Probably the raisin moth would also be a menace.

Fumigation—The most practicable method of destroying the insects and their eggs is by fumigation with a gas or vapor poisonous to them. Farm-scale fumigation has been discussed in more detail in another publication of this experiment station.[a]

The favored fumigant in commercial dried fruit packing establishments at present is methyl bromide. The manufacturers and distributors of this fumigant supply it in liquefied form in steel cylinders of convenient size, together with measuring and dispensing equipment. They also supply service men who personally instruct users in handling and applying it. Such instruction is vitally important, because this fumigant is fatally toxic to humans and must be handled intelligently. It is extremely destructive to insect life, is nonexplosive and leaves no taste or other objectionable residue on or in the treated product. It is used at the rate of about one pound per 1,000 cu. ft. of storage space. Thus a room 12 ft. wide, 30 ft. long and 7 ft. high contains 12x30x7, or 2,520 cu. ft. and would require about 2.5 lb. of the fumigant. It is piped into the room at strategic points. The liquefied fumigant enters the pipes and escapes as a heavy vapor into the storage room. It is allowed to act overnight or longer.

Chloropicrin has also been used, but usually in outdoor fumigating boxes on the farm. It is potent, but is very irritating to the eyes, nose and throat; in fact, it is the well-known tear gas. Its terrific irritating effect is sufficient warning to prevent serious injury to workmen.

Carbon disulphide should never be used as a fumigant for dried vegetables because of its "hair trigger" explosiveness and inflammability. Prussic acid (hydrocyanic acid gas) leaves a poisonous residue in the product and is extremely dangerous for inexperienced workmen to handle.

Ethylene dichloride and carbon tetrachloride are common, inexpensive heavy liquids of low boiling point. A 50:50 mixture of the two placed in shallow pans on top of the piles of dried products soon vaporizes and fills the room with heavy vapors that are fairly satisfactory insect destroyers; however, methyl bromide is much more effective. The above mixture is used at the rate of 15 to 20 lb. per 1,000 cu. ft.

Ethylene oxide is another fumigant in common use in the dried-fruit industry. It is applied in much the same manner as ethylene dichloride, and like the latter is not excessively toxic or irritating to workmen.

After packaging, the cartons are best fumigated by the vacuum process. The cartons are placed in a large steel cylinder similar to a commercial cannery retort. This is then closed and evacuated. Then the fumigant enters under vacuum and penetrates the packages. Details of the equipment and procedure may be had from the State Department of Agriculture, Sacramento, Calif.

Insects breed in great numbers in piles of fruit wastes, or in discarded vegetable trimmings, and similar trash. The premises and nearby grounds should be kept free of such refuse. It is advisable also to screen all doors

*This series of articles on the dehydration of vegetables is largely a compilation of the information existing at the time the manuscript was prepared. Research will undoubtedly bring about changes, but for the present the series constitutes a complete and up-to-date "handbook" on vegetable dehydration.

and windows in the packing room to exclude insects in so far as possible. In fact, it is highly desirable that the packing room and the room in which cartons and boxes for packaging the final product are stored be tightly constructed in order that they may be fumigated occasionally.

The insect eggs and other insect forms on dried vegetables can be destroyed by heating the dried products to 140 to 150 deg. F. for at least an hour.

Cold Storage—Insects do not develop at temperatures near the freezing point. Thus, it is possible to store packaged vegetables indefinitely at 32 to 36 deg. F. in so far as protection against insects is concerned. However, it is advisable to protect them against absorption of moisture and cold-storage odors by enclosing them in sealed boxes or cans. Cold storage also greatly retards undesirable changes in color and flavor.

Nonbacterial Deterioration – Dried vegetables slowly deteriorate through oxidative and other changes. These changes are much more rapid and severe in those that are not blanched before drying because the enzymes responsible for the undesirable changes remain active in this case. Blanching at 190 to 212 deg. F. before drying destroys the enzymes and thereby greatly prolongs the keeping quality of the dried products.

Nevertheless, even the blanched dehydrated vegetables slowly deteriorate in flavor, odor and color. Such changes are retarded by packing the dried vegetables in vacuum sealed containers; also, as previously noted, by storage under refrigeration.

Some vegetables keep much better than others; dehydrated carrots and potatoes, for example, retain their color and flavor better than does dehydrated spinach. Recently we had occasion to use dehydrated potatoes, carrots and string beans stored at room temperature in friction-top cans for three years. The potatoes and carrots were very satisfactory after soaking and cooking, and the beans had a noticeable hay flavor but were of satisfactory texture and color.

Molding—Molding will occur only if the moisture content is excessive. The best protection against mold is to dry to below 5 percent moisture content and seal hermetically.

*Packing**

The final package should be inexpensive, attractive in appearance and as nearly insect-proof and moistureproof as possible.

Cartons—Most dried fruits are packed in paper cartons lined with some moisture-resistant material such as waxed paper, vegetable parchment, cellulose film such as Cellophane, or Pliofilm. The cartons are wrapped with tightly fitting lithographed paper and often with a waxed wrapper, cellulose film or aluminum-foil wrapping over the paper.

The dehydrated vegetables should be fumigated before or after packaging to destroy all insect life; or they may be packed directly off the trays while still hot and before insects have had an opportunity to lay eggs on them. In either case the cartons and cases should be fumigated before use to render them free of insect eggs.

The cartons are usually filled, sealed and wrapped by machine.

The two serious objections to cartons for use with dehydrated vegetables are their susceptibility to insect infestation and to penetration of moisture. Pliofilm inner linings, however, can be made practically watertight but not insect-proof. Beetles that infest dried foods and the newly hatched larvae of the Mediterranean meal moth apparently can enter by openings so small as to escape the eye. Adult beetles can easily eat their way into a carton.

Since dried vegetables, owing to their higher drying ratios, must bring a much higher price than dried fruits, it would seem no more than a justifiable precaution to use insect-proof packages, even if slightly higher in cost than cartons.

At the time of packing, all dried vegetables should be very dry, not above 5 percent moisture in most cases and a maximum of 3 percent is desirable for some vegetables.

Cans—An ideal container for dehydrated vegetables is the key-top can such as used for dry-pack prunes and for coffee. If reinforced to prevent collapse under vacuum, or if tightly filled so that the dried product will support the walls, the filled cans may be sealed under a high vacuum. The vacuum will protect the product against oxidative changes and will kill insect life or prevent its development.

The cans may be packed to desired weight by hand. Normally, some pressure must be applied to secure a satisfactory net fill in weight. The cans may then be sealed by a special vacuum-can sealing machine which may be rented from a can manufacturer. Or, if the rental charge for such a machine is considered unjustifiable, the cans may be filled, the first seaming operation applied, the cans heated in live steam for 6 to 8 minutes and the second sealing operation applied. If the first sealing operation only is applied, air can escape on heating, and after applying the second operation and cooling, the can will develop considerable vacuum. If this method is used, the packer must be certain that the vegetables before packing are absolutely free of insect life (eggs particularly).

Friction-top cans of the type used for wheat germs and paints are usually insect-proof and reasonably moisture-proof. They have been used very successfully for dried vegetables.

Powdered vegetables should be packed only in tin or glass containers; preferably airtight ones to prevent not only insect infestation but also absorption of moisture with consequent caking. Also, such powders are very susceptible to oxidative changes; hence, exclusion of air as in a vacuum-sealed tin or jar is desirable.

In 1917 and 1918, dehydrated vegetables for Army use were packed in 5-gal. kerosene type cans of rectangular shape. The vegetables were filled into the cans through a circular opening in the lid, which was then sealed by soldering a circular piece of tin over the opening.

Glass Containers—Glass jars also can be made moisture- and insect-proof. Some are sealed under vacuum and would probably be preferable to other types for vegetables. One great advantage of glass is the visibility of the product. Another is the resealability of most glass jars. The disadvantages are the greater weight and fragility of these containers.

Bricks and "Sausages"—Dried vegetables can be compressed into dense bricks or cylinders ("sausages") which may be wrapped in a suitable manner, as in paper with an outer aluminum-foil wrap or in transparent cellulose. Or the bricks may be packed in cartons or in cans.

If compressed to high density, the products are fairly resistant to insect attack. Soup mixtures are often packed in this manner for use by hikers and campers, since a great deal of food is available in a small volume. Spinach "bricks" were packed at one time by a commercial vegetable dehydrating company in California. In this case the dried whole leaves were compressed into slabs which were sawed into bricks.

Use of Dehydrated Vegetables

Refreshing—Unfortunately, for the best results most dehydrated vegetables should be soaked in water for some time before they are cooked; otherwise they

*EDITOR'S NOTE: This information on packaging was written before the wartime restrictions and shortages became effective, so these new factors must be taken into consideration. The reader is referred to a special section on current packaging problems published in FOOD INDUSTRIES, April, 1942, pages 35 to 50.

are apt to remain tough and shriveled. This preliminary soaking is usually termed "refreshing" or "refreshening."

The mistake should not be made of adding too much water; only enough should be used to permit "plumping up" to approximately the original volume of the fresh product, with enough water remaining to almost, but not quite, cover the vegetables. For potatoes and peas this may be about 3 fl. oz. of water to each ounce by weight of dried product, and for spinach and cabbage perhaps 6 to 8 fl. oz. per ounce of dry weight. A few trials will determine the best ratios. The label on the packages should give explicit directions for refreshing and cooking. Powdered vegetables usually cook well without preliminary soaking.

Cooking Without Refreshing—It is feasible to prepare most dehydrated vegetables so that they require no preliminary soaking. This is done by slicing them very thin or shredding them into very slender pieces so that they are paper-thin after drying. Before drying they are thoroughly blanched, in fact precooked.

Cooking – Dehydrated vegetables, after refreshing as previously described, are salted to taste and then cooked slowly until tender. Since dehydration unavoidably removes some of the delicate flavors and odors of the fresh products, cooks will find it desirable to add suitable seasoning, such as a few strips of ham, bacon or smoked beef, or a clove or two of garlic or a little basil and sliced onion. Tomato sauce is a pleasing addition to some products. Others, such as beets, parsnips and carrots, are benefited greatly by addition of butter just before serving. For some consumers peas are improved by cooking in milk or serving in a well-buttered cream sauce; similarly for dehydrated corn.

To vegetable soups it is desirable to add meat stock or ham, or a soup cut of meat to enrich them. Rice or pearl barley also may be added.

Powdered pumpkin may be cooked with milk and sugar and thickened with egg before filling into the pie crust.

White potatoes after refreshing may be fried, "scalloped," etc., in the same manner as the fresh; or may be cooked until soft and mashed with milk and butter.

In other words, after refreshing overnight or for a half day in water, the dehydrated vegetables may be cooked in any of the many ways commonly used for fresh vegetables. And thinly sliced or shredded, heavily blanched dehydrated vegetables may be cooked in water without preliminary soaking.

Laboratory Examination

As in the production of other foods, it is highly desirable that operations be controlled by laboratory examination of the finished product. The most important routine tests are moisture determination and behavior on refreshing and cooking of representative samples.

Refreshing Tests—Of considerable value is a quantitative refreshing test conducted about as follows: 50 grams of the sample as removed from tray, bin or final package is placed in a beaker or jar. For such products as peas, potatoes, corn and sweet potatoes, about 200 c.c. of cold water is added; for other vegetables, 300 to 500 c.c., depending on the drying ratio—about 300 for root vegetables and 400 to 500 for such vegetables as string beans, tomatoes, spinach and cabbage. If the vegetables float, a piece of wire screen can be cut to fit the beaker to keep them submerged. They are left 12 hours, at room temperature. They are then drained for 3 to 4 minutes on a screen and again weighed. With a little experience with different lots, a minimum drained weight for each vegetable can be established and can be used as a "measuring stick" of refreshing value.

Also, notes on the color, texture, odor and taste should be taken.

Cooking Tests—The samples from the refreshing tests may be salted to taste and cooked in the beakers in live steam or on a hot plate for a specified length of time found best for samples of perfect quality. The time will vary with the vegetable, but in our experience it is about 30 minutes steaming for potatoes, peas and corn and 60 minutes for most other products. Once the length of time found best for each variety has been established, it should be used for all samples of that variety in order that texture may be judged comparatively.

Cooking over on a hot plate in beakers can also be employed, but care must be taken to avoid boiling dry and scorching. We find cooking in a steam box a more convenient method and free of any danger of scorching.

The flavor, texture, color and odor of the cooked samples should be judged critically and the observations recorded. Also, the drained weight should be determined.

Of considerable value also are observations on behavior of the vegetables when boiled 20 to 30 minutes in water without preliminary soaking. The Army desires dehydrated vegetables that may be cooked without preliminary soaking.

Scoring—The refreshing and cooking tests give a good basis for judging the

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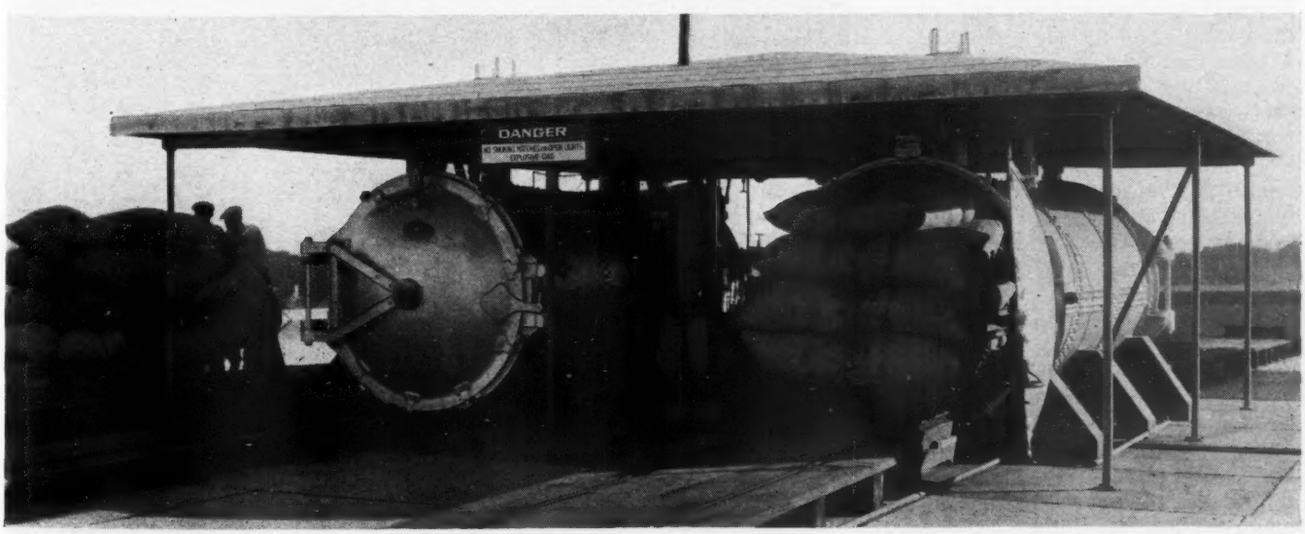


Vacuum fumigation equipment of the type used for dehydrated foods.

How To Convert Brewery To Industrial Alcohol Production

By G. T. REICH
Technical Director, Pennsylvania Sugar Co., Philadelphia, Pa.

To convert anything but the machine shop of a food plant to a war industry is difficult. But Dr. Reich shows how a brewery can be converted to make industrial alcohol. At our suggestion he visited several breweries and decided that they could be converted. If that wooden beer still dismays you, remember that the author has built and used them.

THE need for industrial alcohol by our defense industries is increasing daily. More and more restrictions are imposed upon its use for nonwar purposes, as the facilities of distilleries manufacturing industrial alcohol from molasses are inadequate and the raw material is not so readily available as it was before we entered the war. Synthetic alcohol plants using ethylene as a raw material are being built or expanded, but will not be able to meet the demand for explosives or for synthetic rubber purposes. Therefore, a new source of supply has had to be tapped and the government has released 60,000,000 bu. of grain to the whiskey manufacturers who are operating full capacity seven days per week. In spite of this, the demand for ethyl alcohol is not satisfied. The question arises: Why have the breweries not taken an active interest in converting their idle or partially idle plants into industrial alcohol plants?

During the prohibition era, up to the dealcoholizing stage the brewers performed the same operating steps as the grain distillers. If brewers could do it then, the more reason to do it today, as the margin between the cost of raw material, operating expenses and market price assures fair returns for their efforts.

In Fig. 1 a flow diagram compares the various steps of operation in a brewery and an industrial alcohol plant. In both plants grain and malt are the raw materials. While malt is the main ingredient in the brewing process, corn is the main raw product in industrial alcohol, the malt serving chiefly for the liquefaction and saccharification of the starch. A description is given below of the various steps in the manufacture of industrial alcohol, utilizing the facilities present in any standard brewery and augmenting these with additional equipment, which could be constructed at a small expenditure.

Assuming that a brewery intends to manufacture 2,000,000 gal. of 190 proof alcohol per year or approximately 6,000 gal. per day, then for mashing purposes the requirements would be 2,400 bu. of corn and malt per day. A beer wort of 12 deg. Balling made from 70 percent malt and 30 percent grits requires 35.53 lb. of malt and

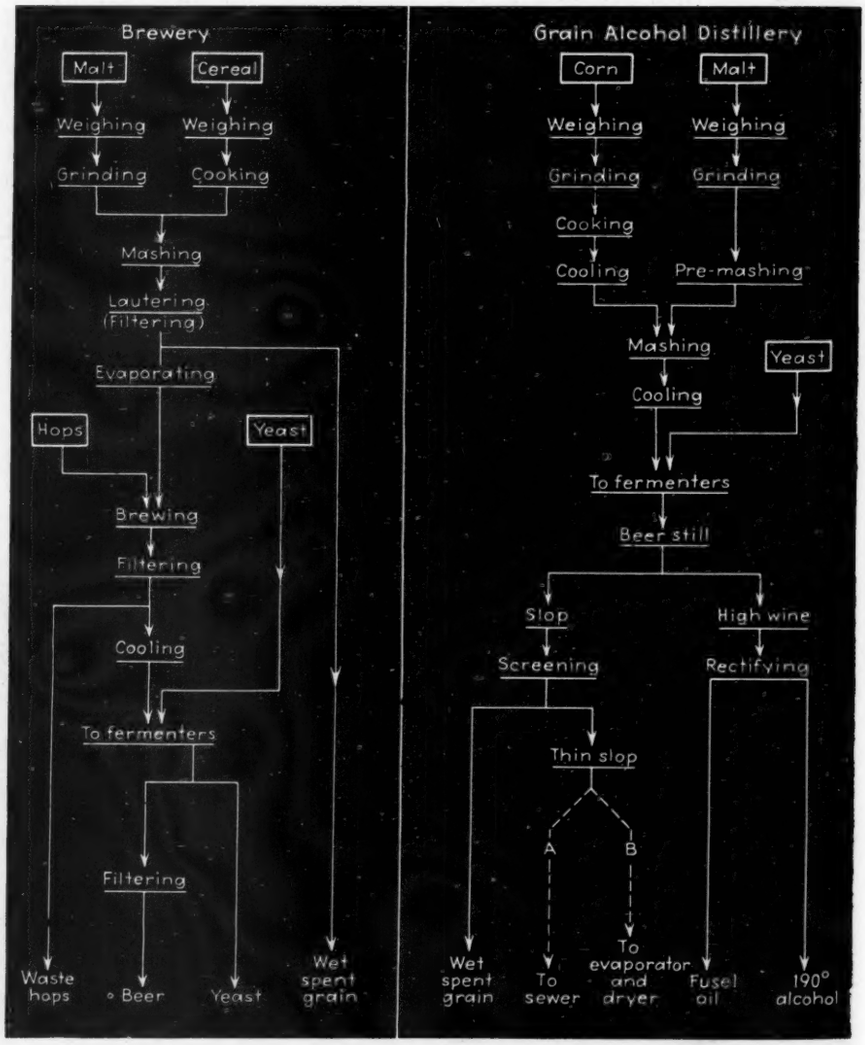


Fig. 1. Functional flow diagram of a brewery compared to a grain alcohol distillery.

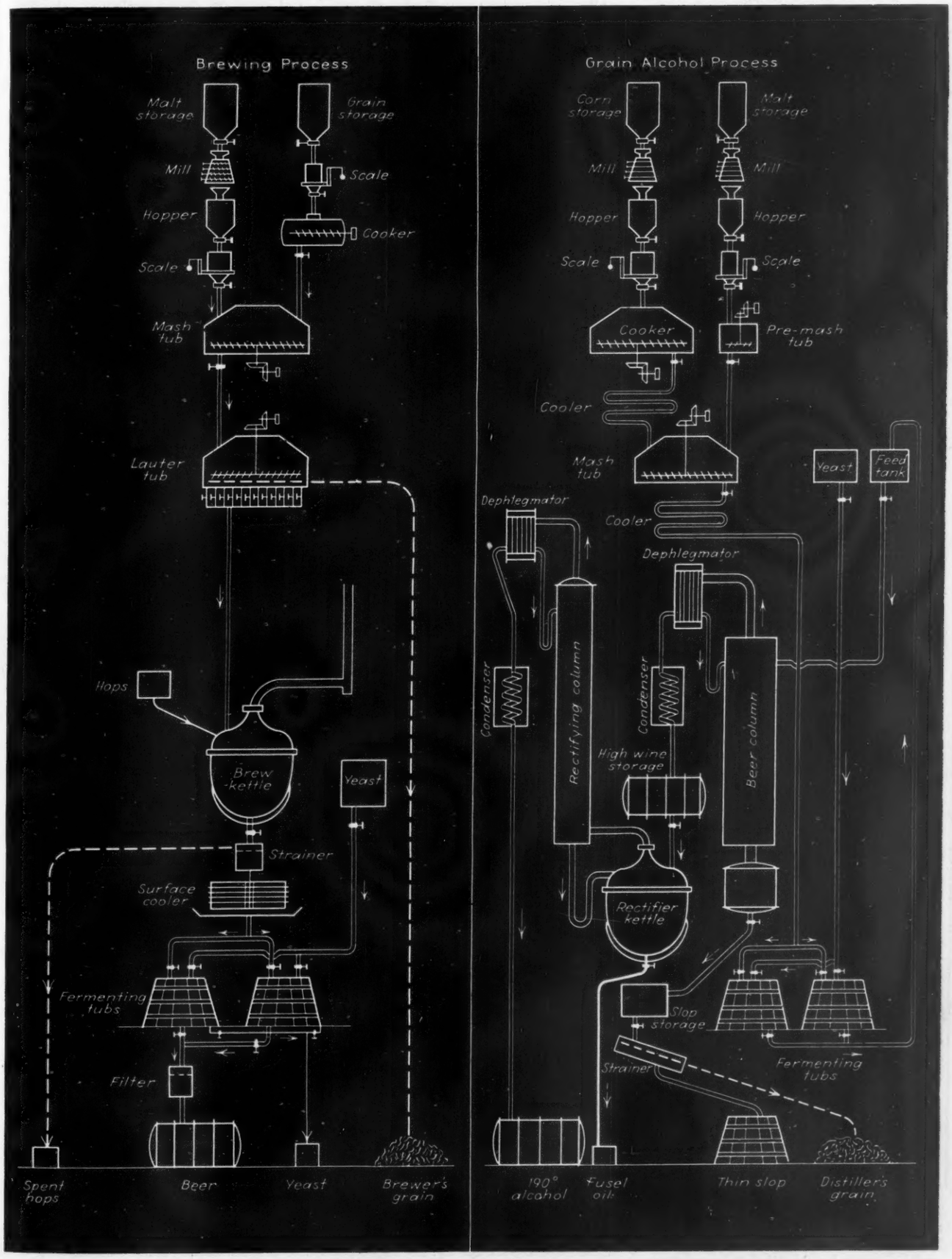


Fig. 2. Equipment flow diagram of beer brewing showing how standard brewery equipment can be augmented by other available equipment to convert a brewery to a distillery for the production of industrial alcohol.

12.99 lb. of grits per barrel, or a total of 48.52 lb.[1] Consequently, a brewery having a production capacity of 1,500 bbl. per 24 hours could easily be converted into a distillery of the above-stated capacity.

[1] "Practical Points for Brewers," by the National Brewer's Academy, New York, N. Y.

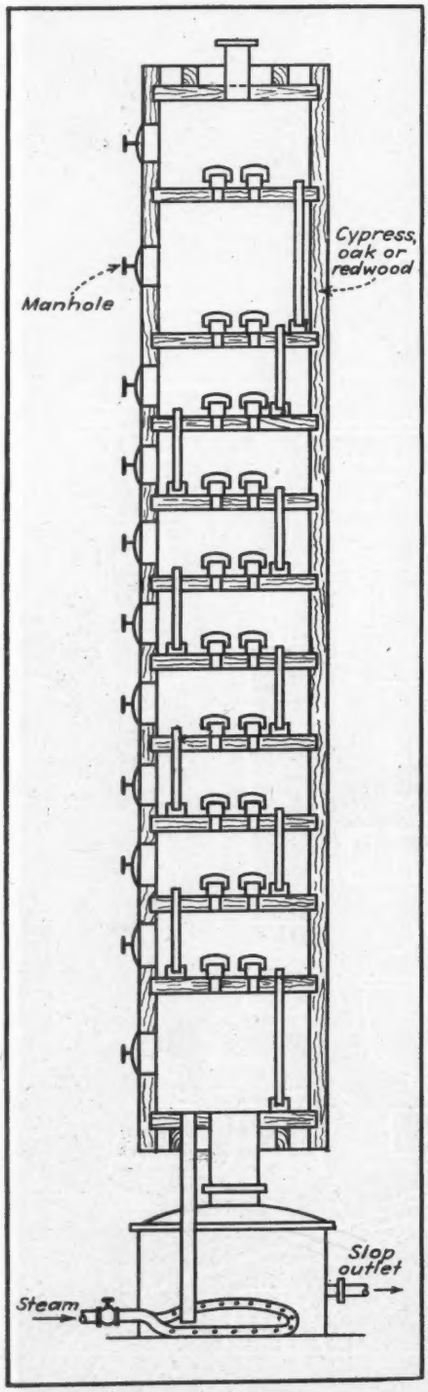


Fig. 3. Here is a beer still in which to distill distillers' beer, not brewers' beer. And, believe it or not, it is made of wood, not copper, except for the slop discharge chamber which could be a glass-lined ring with top and bottom.

The corn, ground as finely as possible, is charged into the atmospheric cooker for which the brewery mash tubs would serve in the present instance. Fig. 2 shows the layout of the equipment of a reconstructed brewery. For cooking, 25 gal. of water is required per bushel of corn. Also a small amount of malt, about 10 percent of the total amount of malt, is added, which aids the gelatinization of the starch during cooking. The distillers require a malt having a diastatic power of over 150 in degrees Lintner, in contrast to the brewer's malt which on the average must be far below 150.

The temperature of the corn mash is raised to 212 deg. F. and maintained at this temperature until the liquefaction is completed. The mash must be cooled rapidly to 155 deg., and afterwards sufficient malt added, usually 5 percent by weight on the corn used, so that within 30 minutes to one hour the saccharification is completed, converting the starch into fermentable maltose and dextrose. Then the mash is cooled further to 78 deg. before entering the fermenters where, mixed with the yeast, the fermentation is completed within 72 hours. A detailed description of this process has been published in *Chemical & Metallurgical Engineering*, Vol. 40, 1933.

It is possible to provide the mash tub with copper cooling coils, in which case cooking and mashing could be done in the same tubs. The lauter tub, provided with another set of cooling coils, could also serve as a mash tub, thus permitting a greater production of alcohol. The flow chart indicates the possibilities of utilizing the available equipment and avoiding large investments and long delays. Attention is called to the 72-hour period of fermentation as against 144 hours required in breweries, indicating that the latter have more than ample fermenting-tub capacities for large-scale production of industrial alcohol. No comments are required pertaining to the propagation of the yeast, in which the breweries are proficient. The fermenter capacities are usually figured at 45 gal. per bushel of grain mashed.

After the fermentation is complete, the beer, containing 7.0 to 8.5 percent of alcohol by volume, is pumped to the beer still. Owing to the large amount of water in the beer and owing to the existing scarcity of copper, there is no reason why a wooden beer still would not serve just as well for dealcoholizing purposes. Cypress or redwood beer stills can be built quickly and cheaply. The fermented beer enters near the top of the beer still as indicated in Fig. 2. The live steam enters at the bottom, countercurrent to the flow of the beer, which is dealcoholized during its downward flow. The alcohol vapors pass first into the dephlegmator, where partial condensation takes place. The condensate is returned to the beer still, while the uncondensed vapors pass into the condenser, leaving it as a high wine spirit of 100 to 140 deg. proof. This condensate contains acetaldehyde, alcohol and fusel oil. The fusel oil plays almost the same role in whiskey making as hops do in brewing beer.

Industrial alcohol, complying with the government specifications, must be a high-proof alcohol, low in acetalde-

(*Turn to page* 98)

TABLE I — Comparative Material Balance in Breweries and Distilleries [1]

Production ratio: 1 bbl. of beer or 4 gal. of alcohol.

	BREWERY	DISTILLERY
Produced per 24 hours	1,500 bbl. beer	6,000 gal. 190° alcohol
Total mashed	72,780 lb.	134,400 lb.
Corn (56 lb. per bu.)	.....	127,600 lb. or 2,280 bu.
Corn grit (30% of mash)	21,834 lb.	.....
Malt (70% of mash, 34 lb. per bu.)	50,945 lb. or 1,498 bu.	6,800 lb. or 200 bu.
Spent grain recovered	Wet, 70,000 lb. or Dry, 15,500 lb.	Wet, 120,980 lb.[2] or Dry, 26,800 lb. Dry, 43,200[2]
Steam — Cooker, Mash tub, Sparging, Brew kettle, Yeast, Fermenters, Pasteurizer, Bottling, Hot water	350,000 lb.	500,000 lb. — Cooker, Mash tub, Yeast, Fermenters, Stills, Hot water
Grain dryer (steam)	30,000 lb.	53 to 75,000 lb.[2] or [3]
Fermenting tubs, capacity		
Brewing, 7-day period	388,885 gal.	.....
Distillery, 3-day period (45 gal. / bu.)	.....	272,100 gal.
Power for refrigeration	400 hp.	.....
Power for motors	.....	250 hp.
Refrigeration load	275–300 tons	.....
Water	200–300 g.p.m.	250 g.p.m.

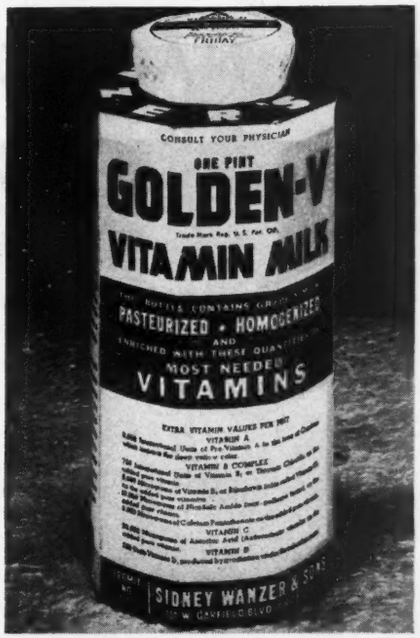
1. Data are approximate, as the steam, power, refrigeration and water requirements depend upon the design of the equipment and economical utilization of waste heat.
2. One bushel of corn yields approximately 11.2 lb. of dried distillers grain, consisting only of the suspended solids in slop.
3. Applies to the recovery of all suspended and dissolved solids in slop.

NEW PACKAGES & PRODUCTS

Multi-Vitamin Milk

SIDNEY WANZER AND SONS, Chicago, is marketing "Golden-V Vitamin Milk," a pasteurized, homogenized milk scientifically enriched with an adult's daily requirements of seven vitamins. Golden-V, now being introduced to Chicagoans, was first sold by the Golden State Co., Ltd., in California last spring, where it was accepted by thousands of daily users.

More than just a top-quality milk, Golden-V has a balanced supply of seven vitamins carefully added, A, B_1, B_2, C, nicotinic acid amide, calcium pantothenate and vitamin D. Wanzer's Golden-V is sold only in pint bottles, covered with a special "Vita-Shield" to protect the added vitamin content. Customers are asked to leave the Vita-Shield on the bottle until the milk is consumed.



Crunchy Peanut Butter

NOMINATED by many who have eaten it as one of the best peanut butters on the market, "Peanut Crunch" now

makes its appearance in a popular-priced 9-oz. container.

Introduced some time ago by Holsum Products, Milwaukee, Wis., this improved peanut butter is made of top-quality peanuts, with salt added. By a special process, small particles of freshly roasted peanuts are distributed throughout the product, giving Peanut Crunch a distinctive flavor and making it "crunchy." It is now sold in the new 9-oz. jar, in a 1-lb. jar, and in a 5-lb. container for restaurant, hotel and lunch-counter use.

Two-in-One Bread

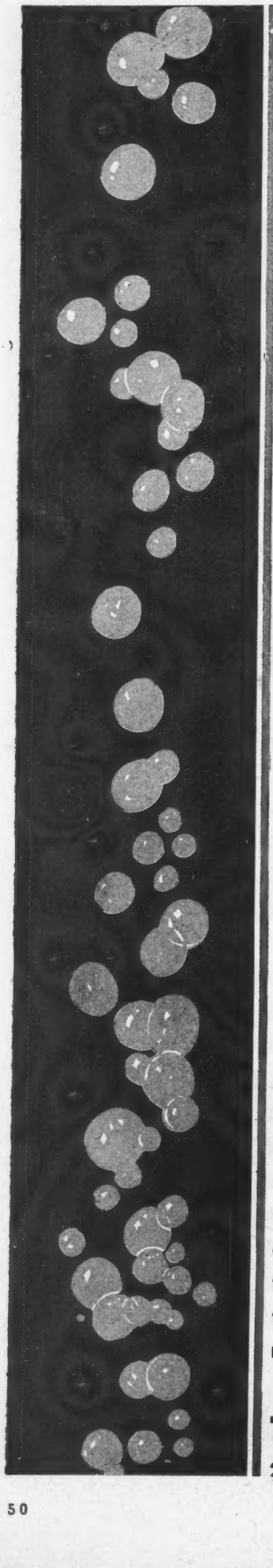
"TWIN-PACK 2-IN-1 BREAD," invented by Columbia Baking Co., Atlanta, Ga., consists of two separately wrapped loaves in one package that can be split in two — one loaf for immediate consumption, the other, completely wrapped and fresh, to be kept for later use. Advantages of the new package are many. There is less risk of waste. It solves a problem when some of the family prefer white bread and some whole wheat bread. Whole wheat bread can be introduced in this way into homes where it is not on the daily shopping list.

"Southern" Twin-Pack breads are available in all sliced white bread, all sliced whole wheat bread, and two-in-one, or half white, half whole wheat.

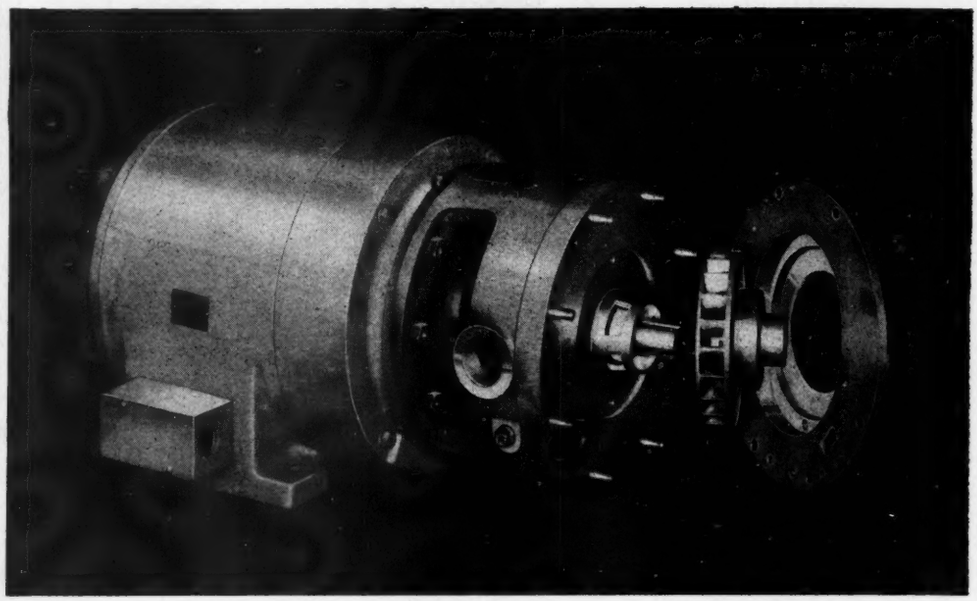
Columbia Baking Co. recently won a top award in the annual All-America Package Competition, sponsored by *Modern Packaging*, for its Twin-Pack bread. The company built and patented all equipment used in the packaging operations.

Canned Lima Loaf

CANNED LIMA BEAN LOAF, that may be used as a substitute for bread, potatoes, vegetables or dressing, is the product of California Consolidated Canneries, Inc., Los Angeles. The outer skins of the limas are removed before the beans are packed in 15½-oz. tins, sealed, and cooked. The "Mario" lima bean loaf may be sliced and fried in butter, diluted with milk to make soup, baked en casserole, or used as dressing.



ONLY CLEAN AIR CAN REACH YOUR PRODUCT FROM A NASH COMPRESSOR



Here is a compressor designed perfectly to meet the needs of the Food Plants. It is simple, for it has only one moving part, a rotor cast in one piece and rotating in the casing without metallic contact. This means trouble-free operation over long periods. It is compact and requires little valuable floor space. Its oversize ball bearings seldom require attention or lubrication. No lubrication is required in the interior, so that the air is kept clean from the time it enters the pump. • But this is not all. The compressing medium in the Nash Pump is a rotating column of clean water. The air is in intimate contact with this water in passing thru the pump and is actually scrubbed while it is being compressed. Dust present in the atmosphere is removed, and the air delivered free from dirt, oil, or heat, without the use of scrubbers or air washers. Think what this means in terms of purchase cost and floor space occupied by complicated air washing apparatus. • These pumps are proving their worth in the most trying service. They are ideal for transferring beer or wort from tank to tank by air pressure, for maintaining pressure on aging tanks, for supplying compressed air to bottling machines in racking, etc. • Available in any capacity, these pumps deliver pressures up to 40 lbs. absolutely uniform without storage tanks. • You want the most reliable pumping equipment in your plant, so by all means find out more about the Hytor. Our catalog No. 217 is free on request.

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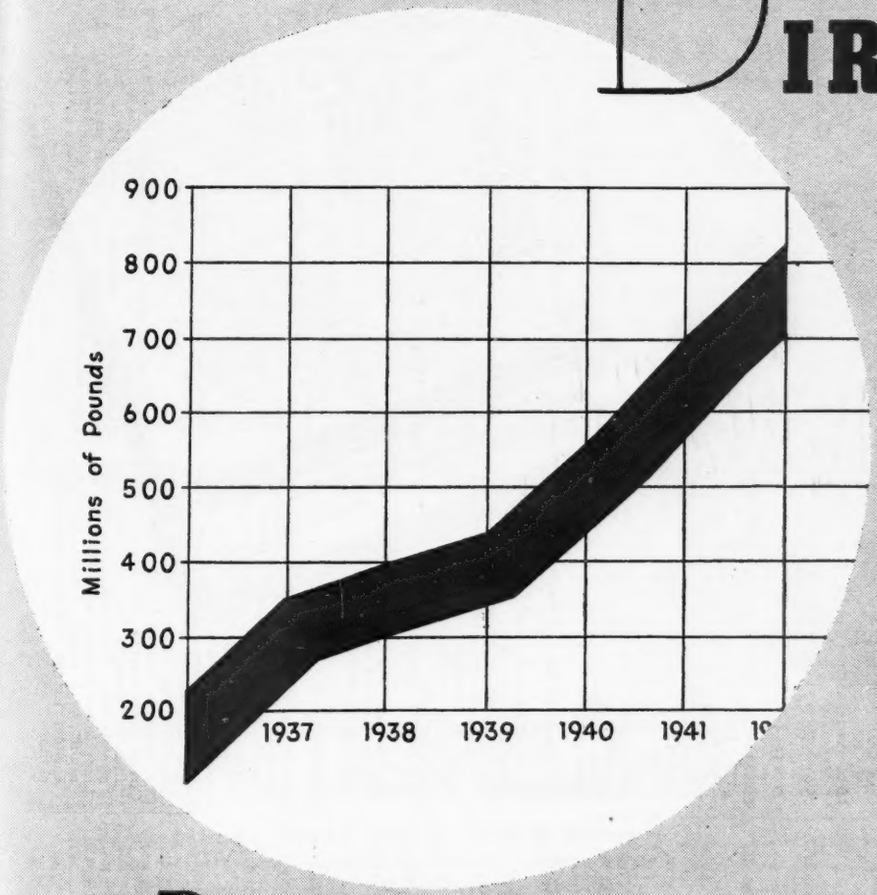
1942 EDITION

FROZEN FOODS DIRECTORY



PRODUCTION of frozen foods continues its upward climb, as shown by the curve. Statistics collected by *Food Industries* indicate that the 1940 production in the United States amounted to 555,881,000 lb.; that for 1941, 697,481,000 lb.; and the anticipated 1942 production, 823,931,000 lb. These figures include production of cold pack fruits and quick frozen fruits, vegetables, meat, fish and poultry.

Most of the output is made up of quick frozen products. For 1940, the production of quick frozen foods is placed at 390,185,000 lb.; for 1941, 492,485,000 lb.; and production this year is expected to reach 588,085,000 lb. Part of the increase in quick frozen foods production in recent years is attributable to the fact that some freezing not formerly considered "quick" has now been placed in that category.

Expressed in percentage increases, frozen food production went up 25.5 percent in 1941 and is expected to increase by more than 18 percent this year. Quick frozen food production was up more than 26 percent in 1941, and the anticipated rise this year is over 19 percent.

Of quick frozen food production about 47 percent is vegetables, 21 percent fruits, 21 percent fish, 7 percent poultry and 4 percent meat.

These figures on frozen food production are based principally upon reports from commercial freezers (as listed in the following pages of the directory), with estimates for unreported production and with allowance for duplication of output in the reports. In estimating unreported production of packaged frozen fish, data from the Department of the Interior were utilized.

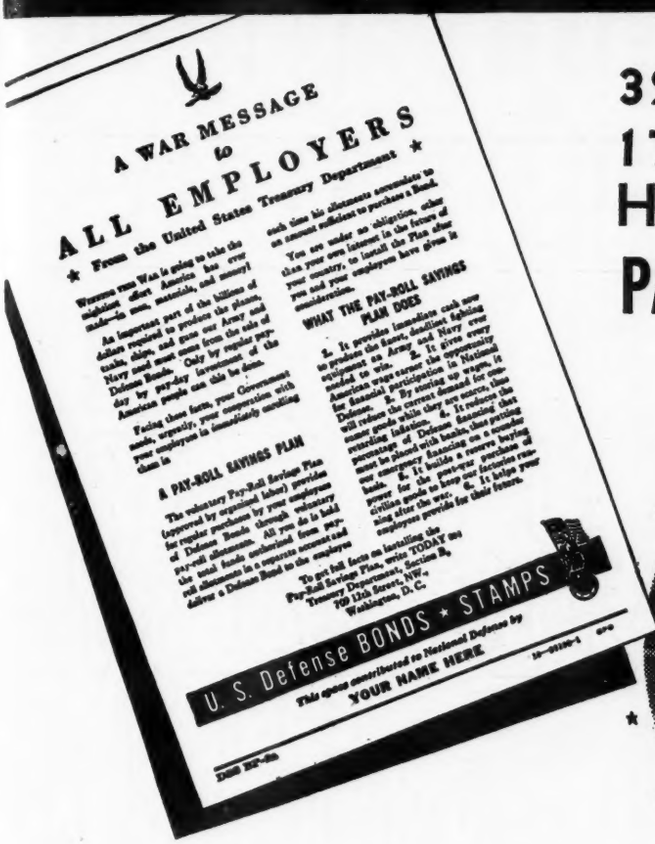
It should be noted that the above figures do not include meat frozen for storage, frozen eggs, unevisserated frozen poultry, nor fish frozen in bulk. Nor do they include the output of some 4,500 locker plants scattered throughout the country. It has been estimated that these locker plants freeze as much as half a billion pounds of food a year, mostly meat, and that many of them freeze and package small quantities of foods for sale locally in competition with the products of commercial freezers.

FROZEN FOODS DIRECTORY

The companies listed in this directory are those engaged in the freezing of fruits, vegetables, meat, fish and poultry for the commercial market. Some major distributors which contract for their output are listed because they are major factors in the industry. Locker plants are not included, nor are the commercial plants freezing eggs, or those freezing meat or poultry for storage.

Company	Freezing plant location	Brand	Products	Container	System	1940 output (lb.)	1941 output (lb.)	Intended 1942 output (lb.)
Armour & Co. Union Stock Yards, Chicago, Ill.	Des Moines, Iowa; Minneapolis, Minn.; Fort Worth, Tex.	Cloverbloom, Gold Band	Poultry (completely dressed)	Various types, including transparent wrapping and paper-board cartons	Sharp freezer	.....	.....	.....
Atlantic Coast Fisheries Co. Fisheries Division, No. 4 Fish Pier, Boston, Mass.	Provincetown, Mass. Also public warehouses at Boston and Gloucester, Mass.; Jacksonville, Fla.; and New Orleans, La.	Nordic, Atco, Frigidsea, Atlanco	All varieties of fish and seafoods. Fillets: haddock, cod, whiting, ocean perch, sole, mackerel. Scallops, shrimp	Cry-O-Vac bags, 5 lb.; corrugated boxes, 10 lb. (transparent wrappers). Solid waxed fibre cartons, 10 lb.; sulphite cartons, 1 lb.	Hurricane, sharp freezer, Jackstone	5,000,000	8,000,000	10,000,000
Barnes & Fisher. Sodus, N. Y.	Wallington, Williamson, N. Y.	.....	Cherries, strawberries, prunes, cherry juice	Tin cans, 30 lb	Air blast, 5 deg. below zero to 5 above.	2,000,000	1,700,000	2,000,000
H. C. Baxter & Bros. Brunswick, Me.	Corinna, Me.	Birds Eye	Peas, beans, cut corn, corn on cob	(See Frosted Foods Sales Corp.)	Birds Eye	Pack included Sales Corp.	in figures for Frosted Foods	
Beutel Canning Co. Bay City, Mich.	Bay City	Michigan	Lima beans, peas, spinach, green beans, wax beans	Transparent bags, cartons	.....	1,000,000	1,500,000	2,800,000
Blue Lake Producers Cooperative. Salem, Ore.	Freezing done by Salem firms	Buyers' brands	Strawberries, youngberries, prunes	Tins, 15, 30 lb	.....	None	43,189	45,000
Bluepoints Co., Inc. West Sayville, N. Y.	West Sayville, N. Y.	Birds Eye	Oysters	12-oz. paper cartons	Birds Eye 25 deg. below zero	160,000	190,000	225,000
R. D. Bodle Co. 71 Spring St., Seattle, Wash.	Seattle, Lynden, Puyallup, Kent, Wash.; Portland, Banks, Ore.	Bodle's, Totem	Strawberries, blackberries, youngberries, red raspberries, loganberries, black raspberries, gooseberries, huckleberries, olympic berries, boysenberries, peaches, prunes, apricots, rhubarb, cherries (sweet and sour), asparagus, broccoli, peas and carrots, cauliflower, corn-on-cob, whole-kernel corn, peas, green beans, wax beans, lima beans, spinach, cooked squash, brussels sprouts, succotash, zucchini	Cartons: transparent-cellulose lined, 10, 12, 13, 16-oz.; 2½, 5, 10 lb. Tins: 10, 15, 30, 50 lb. Fiber cartons: 30, 32, 40 lb. Wood barrels: 50-gal.	Various, as best suited to the product	15,000,000	23,000,000	26,000,000
Bohmann Supply Co. 531 N. La Salle St., Chicago, Ill.	Thansville, Wis	Freshies	Green edible soy beans	Cardboard, paraffined paper, 12 oz.	Sharp freezer	.....	10,000	200,000
Booth Fisheries Corp. 309 West Jackson Blvd., Chicago, Ill.	Boston, Mass.; Chicago, Ill.; Dallas, Tex.	Booth, Tastyloins	All varieties of fish and seafoods	Sulphite board, transparent wrappers, 1, 5 lb.	Cooke process	.....	.....	.....
Boston Fish Co. 18 Fish Pier, Boston, Mass.	Boston	Monogram	Fillets: haddock, cod, pollock, hake, mackerel, scallops	Wooden boxes, 15, 100, 150 lb.	Air blast	75,000	100,000	100,000
Bozeman Canning Co. Mt. Vernon, Wash.	Monroe, Wash. San Jose, Calif.	Frigifoods	Peaches, raspberries, boysenberries, strawberries, peas, string beans, corn, spinach, broccoli, cauliflower, brussels sprouts, Fordhook and Henderson limas, asparagus, apricots	Cartons, 10, 12 oz., 1, 2, 2½, 5 lb.; cans, 10, 15, 30 lb.; fiber cases, 25–30 lb.; fiber cans, 5 lb.	Air blast, 40 deg. below zero	2,500,000	3,500,000	7,000,000
N. W. Brewer Barreling Plant. R. F. D. No. 1, Rochester, Wash.	Tacoma Ice Co., Tacoma, Wash.	N. W. Brewer	Strawberries, blackberries	Barrels, 50 gal	.....	425,000	400,000	400,000
Bridgeman Russell Co. Duluth, Minn.	Duluth, Minn	B-R-Co	Strawberries, peas and some other vegetables for local trade	Butter tubs, 60 lb.; cups, 16 oz.	Sharp freezer, minus 15 deg.	83,000	76,000	90,000
Brookfield Creamery, Ltd. Truro, N. S., Canada	Truro	Brookfield, Colchester	Strawberries, whole chickens	12-oz. waxed paper cartons	Sharp freezer, 20 deg. below zero.	42,000	83,000	83,000
J. D. Brown. Huntington, B. C.	Bellingham Wash., New Westminster, B. C.	.....	Red raspberries	385 lb. in paraffine-lined fir casks	Sharp freezing	.....	123,638	150,000
Brown Packing Co. Christian & Howard Sts., Philadelphia, Pa.	Philadelphia, Pa.; Plant City, Fla.	Brown's Select	Apples (sliced), blackberries, RSP cherries, peaches (yellow and white), pineapple, plums, pumpkin, raspberries (black and red), strawberries, pineapple-coconut, tangerines, pineapple-tangerine, cranberry puree, plum puree, grape puree, strawberry puree, apricot puree, black and red raspberry puree, bananas, huckleberries, blueberries. Also carry a complete line of frozen vegetables.	Cartons, waxed, with vegetable parchment liner, 5, 10 lb.; cans, enamel lined, 10, 15, 30, 35, 38, 40, 50, 55, 60 lb.; kegs, 10, 15 gal.; barrels, 40, 50 gal. Vegetables in 2½, 5-lb. containers	Air blast at subzero temperature for small packages; sharp freezer for bulk containers	6,000,000	6,500,000	7,500,000
California Consumers Corp. 230 W. Jefferson Blvd., Los Angeles, Calif.	Pasadena, Pomona, Los Angeles, Calif.	Trujuis, Pure Froz-n, California Frozen, Full Tide, Green Tide, Prime Froz-n	Citrus juices (orange, lemon and grapefruit), boysenberries, youngberries, strawberries, Forkhook lima beans, asparagus, brussels sprouts, broccoli, cauliflower, string beans, spinach. Custom freezes turkeys, meats, fish, shrimp	Cans, 30, 96 oz., 6 gal. Cartons, 10 oz. to 60 lb. Transparent cellulose, waxed paper, waxed cartons, wooden boxes	Finnegan tubes, with alcohol brine at 35 deg. below zero; shelf freezers, with and without air blast	9,455,000	11,000,000	22,750,000

INDUSTRY ANSWERS THE CALL!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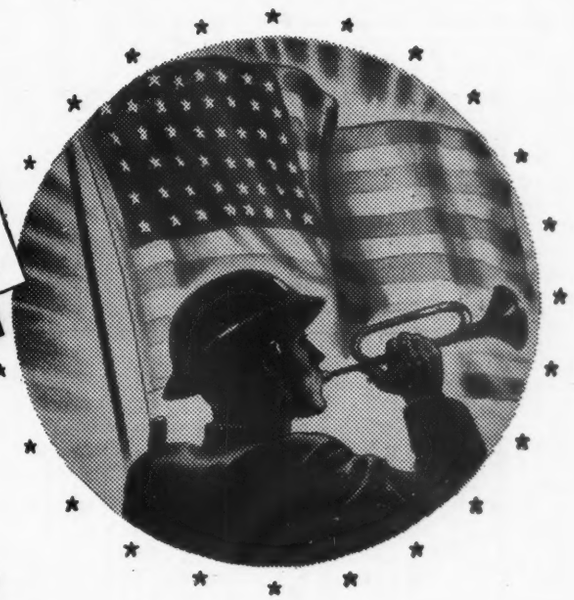

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GPO 16—26944-1 Form No. DSS-280

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1940 output (lb.)	1941 output (lb.)	Intended 1942 output (lb.)
Canada Packers, Ltd. Toronto, Ont., Canada	Belleville, Brantford, Peterboro, Ont.; Quebec, Que.; Charlottetown, Halifax, N. S.	York, Maple Leaf (blueberries only)	Asparagus tips and cuts, green beans, wax beans, lima beans, peas, peas and carrots, spinach, corn on cob, corn off cob, squash, broccoli, brussel sprouts, strawberries, raspberries, red cherries, sweet cherries, peaches, rhubarb, blueberries	Wax paperboard, transparent wrap, 12 oz., 2½ lb.; corrugated box, waxed liner, 10, 20 lb.; jam-type pail, 20 lb.; all-bound box (for blueberries), 30 lb.	Air blast, 30 to 35 deg. below zero	.....	.....	.....
Canadian Frosted Foods, Ltd. Whitby, Ont., Canada	Toronto	Del Glacio, Sun Ripe	Peas and cherries	Peas, 1½-lb. Sealright waxed cardboard; 5-lb. tins. Cherries, 22- and 12-lb. pails	Sharp freezer	.....	.....	.....
Canal Fish Co. Sandwich, Mass.	Sandwich	None	Fish	Wooden boxes, 60, 120 lb.	Sharp freezer, minus 5 deg.	1,000,000	900,000	800,000
H. P. Cannon & Son, Inc. Bridgeville, Del.	Bridgeville	.....	Lima beans	Wax-impregnated carton with waxed paper wrapper and transparent-cellulose bag inside, 5 lb.	Finnegan	.....	.....	.....
Carpenter Squab Ranch 4532 Oakwood Ave., La Canada, Calif.	Los Angeles	Carpenter Squab Ranch	Squabs	Wooden boxes, asphalt-lined paper bags, 12 squabs to box	Sharp freezer, 30 to 35 deg. below zero	1,800 boxes	1,760 boxes	2,000 boxes
Cascade Frozen Foods, Inc 2202 First Ave. South, Seattle, Wash.	Burlington, Seattle, Kennewick, Everett, Wash.	Jack Frost, Agen's Quick Freeze	Apricots, blackberries, boysenberries, cherries, huckleberries, loganberries, peaches (Elberta), raspberries, strawberries (whole and sliced), asparagus, beans (cut and whole), spinach, broccoli, brussels sprouts, carrots, cauliflower, cob corn, cut corn, peas, peas and carrots	Fiber cartons, Cry-O-Pac bags, tins, barrels	Air blast, freezing temperature varies, average zero to 25 deg. below	4,000,000	6,000,000	10,000,000
Cedergreen Frozen Pack Corp. Wenatchee, Wash.	Wenatchee, Monroe, Wash.	Cedergreen	All varieties of fruits, cherries and vegetables	Containers, 12 oz., 1, 2, 2½, 4, 5, 10, 30 lb. Tins, 10, 15, 30, 50 lb. Barrels, 50 gal.	Air blast	3,000,000	5,000,000	8,000,000
Central Fruit Distributors, Ltd. Mission City, British Columbia, Canada	Precooled at Mission City, frozen at Vancouver	.....	Strawberries, raspberries, loganberries, blackberries	Barrels, 40 gal	Ammonia	.....	60,300	.....
Cherry Growers, Inc. 709–715 E. Front St., Traverse City, Mich.	Traverse City	Montmorency, Reddi-Maid	Cherries, raspberries, peaches, apples	Tins, 30 lb	Air blast	6,356,185	4,205,947	10,060,000
Cherry Products Co., Inc. Loveland, Colo.	Beatrice Creamery, Denver	.....	Cherries	Barrels, 45 and 50 gal. Tins, 5, 10, 15 and 30 lb.	.....	348,975	2,110,360	1,500,000
Chickamagua Producers, Inc. Cleveland, Tenn.	Cleveland, Tenn	No brand name	Strawberries. Will freeze peaches this season	Paraffined paper (.020 weight) with heat-sealed transparent liner, 1 and 5 lb. Tin cans, enamel lined, 20 lb.	Immersion, zero and 4 deg. above	242,980	209,132	300,000
Cincinnati Fruit & Extract Works 422 W. 4th St., Cincinnati, Ohio	Cincinnati	Reyam	Strawberries, red raspberries, black raspberries, peaches, California seedless grapes	Barrels, 50 gal	Sharp freezer	90,000	100,000	.....
The Clyde Kraut Co. Clyde, Ohio	Rent space in Toledo, Cleveland, Fremont, Bellevue, Ohio	Silver Fleece	Sour cherries	Tin cans, 15, 30 lb	Zero temperature	None (short crop)	330,000	330,000
Coastates Products, Inc 231 Clay Street, San Francisco, Calif.	.....	.....	Quick frozen enchiladas	.....	.....	.....	.....	.....
Colter Corp. Palacios, Tex.	Palacios	.....	Shrimp, turkeys	Turkeys vacuum-packed in latex	.....	.....	.....	.....
Comstock Canning Corp. Newark, N. Y.	East Pembroke, N. Y.	Comstock's	Peas, green beans, sweet corn, R.S.P. cherries	Packages, 12, 40 oz.; cans, 10, 30 lb.; packages (loose-frozen) 5, 30, 50 lb.	Air blast, Finnegan	514,912	1,440,056	4,967,360
Consumers Packing Co. % Consumers Ice & Coal Co., Lancaster, Pa.	Lancaster, Pa.	Consumers	Peas, corn, Fordhook lima beans, snap beans, meat	12- and 40-oz. containers	Air blast	275,000	344,000	550,000
B. Frank Craddock Co. Dyersburg, Humboldt, Tenn.	Dyersburg, Humboldt	Craddock, Okeena Club	Blakemore and Klondyke strawberries. Occasionally, youngberries, dewberries, spinach, green beans	Cans, 30 lb. Barrels	Air blast, 20 deg. below zero. Also sugar brine quick freeze at 10 deg.	800,000	600,000	600,000
T. W. Crocker Co., Ltd. Newcastle, N. B., Canada	Newcastle, N. B.	Diamond C	Blueberries, salmon, shad, shad roe, smelts, mackerel	Wood boxes, waxpaper lined, 30 lb.; boxes, 10, 15, 100, 150, 200 lb.	Sharp freezer, zero to 20 deg. below	800,000	.....	.....
Crozet Cold Storage Corp. Crozet, Va.	Crozet, Va.	Crozet	Peaches, apples. Plan to freeze strawberries, raspberries and blackberries	Tins, 10, 30 lb.; 30-lb. Parker Bulkans (Sealright Co.)	Air blast 15 to 20 deg. below zero	Not operating	750,000	750,000 or more
Curtice Brothers Co. 20 Curtice St., Rochester, N. Y.	Bergen, Brockport, N. Y.	Blue Label	Peas, corn (whole-kernel), carrots	Cartons, end-opening with inner bag, 2½ and 5 lb.	Sharp freezer	.....	.....	.....
Davis-Cleaver Produce Co. 235 North Fourth St., Quincy, Ill.	Quincy	Ferndale	Poultry	Cans, individual cartons, transparent wrap, Cry-O-Vac	Sharp freezer, 20 deg. below zero	.....	400,000	750,000

Deerfield Packing Corp. Bridgeton, N. J.; Deerfield Packing, Ltd. Montreal, Quebec, Canada	Bridgeton, Montreal	Buyer's brands only	Apples, asparagus, blueberries, broccoli, brussel sprouts, cauliflower, corn, green beans, kale, lima beans, peas, spinach, squash and wax beans, peppers. In Canada, all of above plus strawberries, peaches and raspberries	Waxed cartons with transparent-cellulose liner, 10 to 16 oz., 2½, 5 lb.; bulk case with laminated bag liner, 20, 50 lb.	Birds Eye, Deerfield	40,000,000	50,000,000	65,000,000
DeJean Packing Co. Biloxi, Miss.	Biloxi, Miss.	My-T-Good	Headless shrimp	5-lb. waxed paper cartons	Air blast	200,000	300,000	400,000
Delnor Frosted Foods, Ltd. New Westminster, B. C., Canada	New Westminster	Delnor	Vegetables: Peas, beans, lima beans, corn kernels, spinach, asparagus, peppers, corn on cob. Fruits: Strawberries, raspberries, peaches, apricots, cantaloupe, loganberries, boysenberries, blueberries. Fish: Salmon, sole	Vegetables, 12-oz., 2½, 5-lb., in waxed carton with waxed overwrap. Fruits, 15-oz. cups; 12- and 25-lb. pails; 20-lb. cases, etc.	Air-blast tray freezing	300,000	4,000,000	5,000,000
Dixie Frosted Foods (formerly Southern Frosted Foods) 715 South 21st St., Birmingham, Ala.	Montgomery, Birmingham, Ala.	Dixie Frosted	Strawberries, peaches, lima beans, blueberries	30-lb. sugar pack; 40-oz. containers	Polyphase quick freezer	500,000	750,000	1,600,000
John H. Dulany & Son Fruitland, Md.	Exmore, Va.	Dulany	Vegetables: Asparagus, broccoli, brussels sprouts, cauliflower, corn, green beans, wax beans, lima beans, peas, peas and carrots, pumpkin, spinach, squash, succotash, mixed vegetables. Fruits: Strawberries, blueberries, cherries, peaches, pineapple, raspberries, orange juice, fruit cup. Seafood: Mackerel, shad, haddock, perch, flounder, shad roe, soft-shell crabs, crab meat, shrimp (cooked, seasoned and debiled), shrimp (uncooked), scallops, clams, oysters. Poultry	Packages, 8, 10, 12, 16 oz.; 2, 2½, 5 lb. Tins, 10, 15, 30, 50 lb.	Finnegan	.....	.....	.....
Eau Claire Packing Co. Eau Claire, Mich.	Eau Claire, Mich.	Eau Claire	Black raspberries, cherries	Tins, 30 lb.; Barrels, 400 lb.	Sharp freezer	.....	.....	400,000
The Elyria Canning Co. Elyria, Ohio	Elyria, Cleveland	Moss Rose	Strawberries, raspberries, currants, elderberries, rhubarb, cherries, plums, prunes	Cans, 10, 15, 30 lb. Barrels.	Sharp freezing at minus 10 deg. F.	.....	.....	.....
Epperson & Sons 806-37th Ave., Seattle, Wash.	.....	.....	Strawberries, raspberries, loganberries, boysenberries, black cherries, RSP cherries	Tins, 30 lb. Barrels, 50 gal.	.....	577,500	540,000	770,000
Erb's Kadota Fig Gardens Waterford, Calif.	Modesto, Calif.	Erb's	Figs	Cartons with transparent cellulose liner, 12 oz., 2 lb.	Sharp freezer	4,000	None	.....
F. and M. Packing Co. Traverse City, Mich.	Traverse City	None	RSP cherries	Tins, 10, 15, 30, 50 lb. Barrels	Sharp freezer, 20 deg. below zero	1,250,000	800,000	2,000,000
Fairmont Canning Co. Fairmont, Minn.	Fairmont	Frigidettes, Buyers' labels	Peas, cut corn, corn on cob, lima beans, peas and carrots, carrots, succotash, squash	Waxed cartons, no liner, 12 oz., 2, 5 lb. Corrugated case, laminated-bag liner, 20, 36, 50 lb.	Air blast, 20 deg. below zero	5,856,500	8,070,000	9,000,000
Fairmont Creamery Co. Omaha, Neb.	Omaha, Neb.; Buffalo, N. Y.; New Haven, Conn.	Fairmont	Peaches, red raspberries, black raspberries, rhubarb, apples. Poultry (eviscerated)	Tins 10, 15, 30 lb.; cartons; boxes	Finnegan	2,250,000 (Mostly poultry)	2,820,000 (Mostly poultry)	3,450,000 (Mostly poultry)
Marion T. Fannaly, Inc. Ponchatoula, La.	Ponchatoula	Fannaly's	Strawberries, blackberries, figs, shrimp, soft shell crabs, frogs' legs	Cartons, cans, barrels	Sharp freezer, Air blast, Birds Eye	3,000,000	5,000,000	7,500,000
Farm Bureau Fruit Products Co. Lansing, Mich.	Muskegon, Benton Harbor, Mich.	Farm Bureau, Honest George, Red Mitten	Cherries, strawberries, blackberries, raspberries, apples	Tins, 30 lb. Barrels	Sharp freezer	100,000	1,000,000	1,000,000
Farmers' Commission House, Inc. 403 W. 14th St., New York, N. Y.	Eastport, Riverhead, N. Y.	FCH	Long Island ducklings	Ducks individually wrapped in transparent cellulose or Cry-O-Vac	"Z"	.....	.....	.....

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FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1940 output (lb.)	1941 output (lb.)	Intended 1942 output (lb.)
Farmers Cooperative Union, Inc. Puyallup, Wash.	Tacoma, Wash.	Farmers Cooperative Union, Inc.	All kinds of berries, sour cherries	Barrels, 50 gal.; paraffined tins and cartons, 30 lb.	.....	2,656,935	2,395,683	4,800,000
A. N. Faulkner & Co. Tilghman, Md.	Baltimore, Md.	.....	Strawberries (cold pack)	Tins, 30 lb.	.....	None	None	May pack if supplies are available
Chas. Feller. Marshfield, Ore.	Marshfield	None	Fish	Bulk	Sharp freezer	115,400	137,100	150,000
Florence Fish & Oyster Co. 206 North Irby St., Florence, S. C.	Florence	None	Fish and seafoods	Bulk	Sharp freezer at 5 to 10 deg.	800,000	1,000,000	1,250,000
Food Associates, Inc. Empire Bldg., Seattle, Wash.; 210 California St., San Francisco, Calif. (Sales agent, does not pack)	San Francisco, Calif.; Seattle, Chehalis, Marysville, Wash.	Frostcraft, Tasteful, Kwikway	Strawberries, peaches, raspberries, loganberries, youngberries, blackberries, boysenberries, olympic berries, prunes, apples, apricots, gooseberries, rhubarb, figs, fruit puree, artichokes, asparagus, green beans, lima beans, cauliflower, brussels sprouts, spinach, peas, cut corn, cob corn, broccoli, peas and carrots	.....	.....	.....	.....	.....
40-Fathom Fish, Inc. Boston, Mass.	Boston	40-Fathom	Haddock, sole, cod, scallops, swordfish, flounder, halibut, salmon, mackerel, other seafood	Individual pack	Birds Eye	.....	.....	.....
Fraser Valley Growers, Ltd. Mission City, B. C., Canada	Vancouver, B. C.	Heart O'the Valley.	Strawberries, raspberries (black and red) currants, gooseberries, blackberries, loganberries, boysenberries	Barrels, 40 gal.	Sharp freezer	.....	165,311	175,000
Fresh Frozen Fruits. 1147 Palmetto St., Los Angeles, Calif.	Los Angeles, Santa Cruz, Calif.	.....	Boysenberries, youngberries, strawberries, apricots	Cartons, 25 lb.	Sharp freezer	400,000	1,000,000	2,000,000
Fresno Berry Growers Assn. 4101 Floradora St., Fresno, Calif.	Fresno	.....	Youngberries and boysenberries	Cartons, 30 lb.	Air blast, at minus 20 deg. F.	100,000	300,000	500,000
Frigid Food Products, Inc. 1599 E. Warren St., Detroit, Mich.	Detroit, St. Louis, Cleveland, Toledo	Frigid	All fruits and vegetables	Vegetables: 12-oz.; 2½-, 5-lb. containers. Fruits: 30-lb. cans; 1-, 5-, 10-, 15-lb. containers	Sharp freezer, 25 deg. below zero	.....	3,890,000	.....
Frosted Foods Sales Corp. 250 Park Ave., New York, N. Y.	Corinna, Houlton, Me.; Boston, Gloucester, Mass.; Medina, Mount Morris, Albion, Fulton, Riverhead, West Sayville, N. Y.; Bridgeton, N. J.; Ponchatoula, La.; Indianapolis, Marion, Fort Wayne, Ind.; Omaha, Neb.; Hillsboro, Astoria, Woodburn, Ore.; Fairmont, Wasaca, Winnebago, Minn.; Halifax, N. S.; Newfoundland, Pasadena, Calif.; Wilmington, N. C.; Ketchikan, Alaska	Birds Eye Frosted Foods	Vegetables: Asparagus tips, asparagus cuts, broccoli, brussels sprouts, cauliflower, corn on cob, cut corn, green beans, wax beans, lima beans, peas, peas and carrots, spinach, squash, mixed vegetables. Fruits and berries: Blueberries, peaches, raspberries, rhubarb, strawberries, boysenberries, cherries, mixed fruits. Fish: Fillets of cod, flounder, haddock, halibut, mackerel, red perch, sole; steaks of halibut, salmon, swordfish. Shellfish: Oysters, scallops, green unpeeled shrimp, crabmeat, frogs' legs. Poultry: Squab broilers, broilers, county style fryers, roasting chickens, fowl for fricassee, turkeys, ducks. Beefsteaks: Sirloin, tenderloin steak, rump steak, chopped steak, supper steak. Beefroasts: Pot, rib, sirloin, beef for stew. Lamb chops: Loin kidney chops, rib chops. Lamb roasts: Leg, forequarter, lamb for stew. Pork and veal: Pork chops, sausage links, calves liver	Cartons: fruits, berries, 11, 13, 14, 16 oz.; vegetables, 10, 12, 13, 14, 16 oz.; fish, 5 lb.; shellfish, 12 oz.; poultry, 11½ oz. to 16 lb. or more; meat, ½ to 6 lb.	General Foods Multiplate freezers used for all Birds Eye Frosted Foods	156,000,000 (Figure not official)	218,000,000 (Figure not official)	272,000,000 (Figure not official)
Frosted Fruit Products. 200 Center St., Los Angeles, Calif.	Los Angeles, Calif.	Chill-Ripe	Apricots, boysenberries, blackberries, strawberries, raspberries, peaches, nectarines, tangerines, plums, guavas, feijoas	Vacuum-sealed tins, 1 gal.; tins, 30 lb.	Air blast, 30 deg. below zero	750,000	1,100,000	2,000,000
Frostcraft Packing Corp. 185 Lombard St., San Francisco, Calif.	San Francisco	Frostcraft	Asparagus, spinach, snap beans, lima beans, broccoli, brussel sprouts, cauliflower, strawberries, boysenberries, loganberries, crushed nectarines, black mission figs	Tins, 12 oz., 2½, 5, 30 lb. Two piece Simplex waxed containers, lined with transparent cellulose	Sharp freezer with air blast, 30 deg. below zero	652,000	1,533,000	2,420,000
Frozen Fruits & Juices, Inc. Gasport, N. Y.	Middleport, Buffalo, N. Y.	.....	Strawberries, raspberries, cherries, grape pulp, grape juice	Tins, 30, 50 lb. Barrels	Sharp freezer	Not operating	.....	2,000,000
Fruit Belt Preserving Co. East Williamson, N. Y.	East Williamson	Sea King	Cherries	Tins, 10, 15, 30 lb.	Sharp freezer	298,000	250,000	300,000
Fruit Growers Co-operative. Sturgeon Bay, Wis.	Sturgeon Bay	Sturgeon Bay	Cherries (cold packed only on order)	Barrels; half-barrels; kegs; tins, 30 and 50 lb.	Sharp freezer	2,737,516	6,615,399	5,000,000
General Seafoods Corp. 1–15 Fish Pier, Boston, Mass.	Boston, Mass.	Birds Eye	Fish of all varieties	.....	Birds Eye	(Output included in that of Frosted Foods Sales Corp.)		

Genoa Fisheries..... 250 Northern Ave., Boston, Mass.	Public Cold Storage, Boston	Genoa.....	Fillets (skin and skinless): Haddock, cod, hake, pollock, cusk, flounder, lemonsole, grayssole, red perch, catfish, whiting. Round fish: Sardines, whiting, white bone squid, sand eels, skates wings, monkey fish, porgies, tuna fish, eels smelts, mackerel, butterfish, white bait, shrimp, Spanish mackerel, etc.	Wood boxes (5, 10, 15 lb.) fillets wrapped in parchment paper and transparent cellulose	Sharp freezer; air blast	2,000,000	.....	.....
P. T. George & Co..... P. O. Box 386, Indianapolis, Ind.	Indianapolis.....	Crest.....	Beef steaks, beef specialties, pork items, lamb items	Waxed cartons, 5 and 7 lb.	Multiplate Birds Eye	.....	.....	.....
Gorton-Pew Fisheries Co., Ltd..... Gloucester, Mass.	Gloucester.....	Gorton's Famous Seafoods	Catfish, cod, haddock, hake, ocean perch, mackerel, flounder, grey sole, lemon sole, pollock, whiting, scallops, oysters, clams clam chowder, fish chowder	.....	.....	15,000,000	15,000,000	15,000,000
Gresham Berry Growers..... Gresham, Ore.	Gresham.....	Gresham, Norpac, Multnomah, Flav-R-Pac, Wauna, WestPac	Strawberries, raspberries, blackberries blackcaps, loganberries, youngberries peaches, boysenberries	Barrels, 50 gal.; cartons, 1, 2½, 10 lb.; cans, 10, 15, 30, 50 lb.	.....	.....	.....	.....
Gresham Packing Co..... Box 344, Gresham, Ore.	Gresham.....	Gresham Brand Valley Brand	Strawberries, raspberries, boysenberries, youngberries, black raspberries, blackberries, loganberries	Mostly wooden barrels with paraffin lining	Sharp freezer....	2,100,000	2,600,000	2,400,000
Gulf Food Products Co..... 525 St. Louis St., New Orleans, La.	New Orleans.....	Sun Brand.....	Shrimp.....	Paraffined boxes, 5 lb.....	Sharp freezer, 40 deg. below zero	500,000	750,000	1,000,000
John T. Handy Co., Inc..... Crisfield, Md.	Crisfield.....	.....	Strawberries and fish.....	Strawberries in 30-lb cans.	Air blast.....	550,000 (plus 10,000 doz. soft crabs)	550,000 (plus 10,000 doz. soft crabs)	Same as 1941
Harvey & Co., Ltd..... St. John's, Newfoundland	St. John's, Rose Blanche, Floating Plant, M. V. "Sunset Glow"	I-C-Kold, Birds Eye, G.L.C., Kiltie, Cutlass, Old Colony.	Fish (all ordinary varieties). Blueberries	From 112-lb. bulk to 12-oz. household packages. Fish protected by Cry-O-Vac	Air blast, 20 deg. below zero; indirect immersion, 30 deg. below zero; Birds Eye	4,000,000	4,000,000	4—5,000,000
Haserot Co..... 521 Woodland Ave., Cleveland, Ohio. [Sales factor for Northport (Mich.) Cherry Factory]	Northport.....	Northport.....	Pitted cherries.....	Cans, 30, 50 lb. Barrels, 450 lb.	Sharp freezer....	1,000,000	1,000,000	1,000,000
L. G. Haviland & Sons..... Highland, N. Y.	.....	.....	Currants, raspberries (products usually packed on order)	Barrels.....	Sharp freezing....	200,000	200,000	200,000
Geo. W. Haxton & Son, Inc..... Oakfield, N. Y.	Rent freezers in New York, Ohio, Pennsylvania, Michigan, Louisiana, Oregon, Wash., Virginia, etc.	Blueboy.....	Strawberries, sweet cherries, sour cherries, black raspberries, red raspberries, Columbian raspberries, peaches, grapes, grape pulp, prunes, currants, Damson plums, huckleberries, fruit juices	Tins, 10, 15, 30, 50 lb. Barrels	Sharp freezer, air-blast, Finnegan	.....	.....	.....

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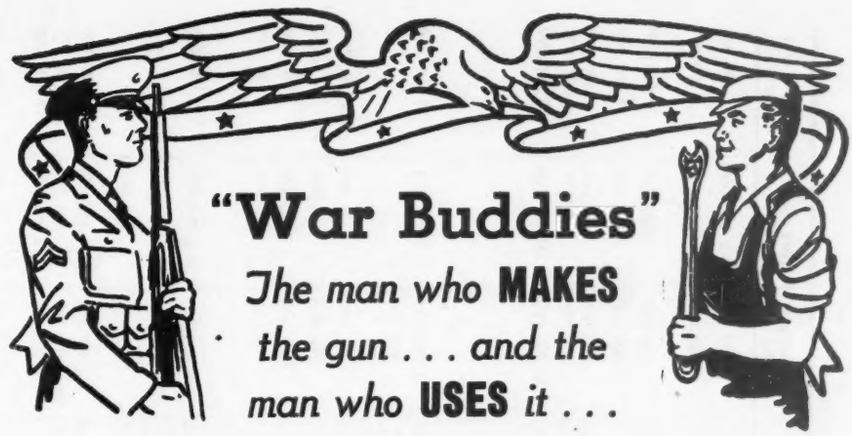
TOLEDO SCALES

OFFICES IN ALL PRINCIPAL CITIES

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1940 output (lb.)	1941 output (lb.)	Intended 1942 output (lb.)
Heeney Frosted Foods, Ltd. 78 Bank St., Ottawa, Canada	Toronto	Zeropak	Strawberries, raspberries, cherries, blueberries, peaches, peas, asparagus, spinach, beans (green and wax), lima beans, corn on cob, brussels sprouts, broccoli, cauliflower, rhubarb, squash, haddock, cod, halibut, scallops, oysters, lobster, swordfish, salmon, lamb chops, beef, other meats	Containers, 12, 16, 40, 80 oz.; 1, 4, 10, 24 lb.	Sharp freezer, about 12 deg. below zero	417,514	500,000	800,000
Henderson Bros., Inc. Monticello, Ga.	Monticello	.....	Peaches	Paper cups, 1 lb. Cans, 10, 30 lb. Barrels, 250 lb.	Sharp freezer	.....	.....	.....
Henry & Close, Inc. 20 Fish Pier, Boston, Mass.	Boston	8 Bells, Land-Ho, Iceberg, Igloo	Haddock, cod, perch, flounder, scallops, whiting, pollock, mackerel	Waxed cartons, 5 lb. Wood cartons, 5, 10, 15 lb.	Birds Eye and Sharp air blast	3,500,000	5,000,000	About same as 1941
Carl N. Hewitt. Summit, Calif.	Cedar Springs, Calif.	None	Strawberries, peaches, apricots, corn	Tins, inside lacquered, 1, 5 gal.; paper cartons, 2 qt. 2½ gal.	Air blast, 10 deg. below zero	.....	20,000	40,000
Hewlett Bros. Co. Salt Lake City, Utah	Salt Lake City	Hewlett's	Strawberries, raspberries, cherries, grapes, plums, currants	Barrels, 50 gal.	Ammonia, zero to 15 deg. above	400,000	450,000	400,000
Honor Brand Frosted Foods Corp. 5601 E. 14th St., Oakland, Calif. (Subsidiary of Stokely Bros. & Co., Indianapolis, Ind.)	Kent, Zillan, Wash.; Santa Cruz, Calif.; Dover, Del.	Honor Brand, World Wide, Galcon Brand	Asparagus, string beans, wax beans, lima beans, cut corn, corn-on-cob, broccoli, brussels sprouts, spinach, cauliflower, peas, strawberries, raspberries, peaches, apricots, loganberries, youngberries, blackberries, blueberries, cherries	Cartons (waxed, transparent bag inside, waxed wrapper), 10, 12, 14 and 16 oz.; 2, 2½, 5, 10 lb., also 30- and 50-lb. containers	Air-blast tunnels, minus 15 to minus 40 deg.	.....	Approximately 8,000,000	Over 10,000,000
House of David Cold Storage. 12th and Market Sts., Benton Harbor, Mich.	Benton Harbor	House of David and private brands	Strawberries, cherries, red raspberries, black raspberries, dewberries, blackberries, gooseberries, boysenberries, grapes, peaches, cauliflower, spinach, mustard greens, corn on cob, string beans	Cans, 10, 15, 30, 50 lb. Barrels, 350 to 450 lb.	Sharp freezer, 20 deg. below zero	4,861,860	5,473,182	.....
Hubbell Squab Co. Box 365, Los Gatos, Calif.	Los Gatos	Dr. Hubbell's Choice Squabs	Squabs	Wax containers, 1 pt.	Brine	12,000	6,000	4,000
Hudson-Duncan & Co. Portland, Ore.	Gresham, Dundee, Ore.	Pride of Oregon	Strawberries, black raspberries (Cuthburt), loganberries, youngberries, boysenberries	Barrels	Sharp freezer	2,400,000	4,200,000	4,200,000
Hudson River Fruit Exchange Inc. Milton, N. Y.	Milton	Hudsonia, buyers' brands	Cherries, red currants, raspberries, grapes, grape pulp, currant juice, gooseberries, plums, quince juice, crabapple juice	Barrels, 50 gal.	Sharp freezer	3,500,000	3,500,000	3,500,000
Ice Delivery Co. Aberdeen, Wash.	Aberdeen and Grays Harbor, Wash.	Sea Frees	Salmon, petrali sole, red rock fish, razor clams, little neck clams, dungenness crabs, oysters	Cry-O-Vac bags, paper cartons and cases	Air-blast tunnel	.....	.....	200,000 (Began operation)
C. S. Kale Canning Co. Everson, Wash.	Everson, Wash.	Selkirk	Raspberries, strawberries	Tins, 15, 30 lb.; barrels, 50 gal.	.....	.....	.....	.....
Kelley, Farquhar & Co. Port of Tacoma, Tacoma, Wash.	Tacoma; Salem, Banks, Scenic, Ore.	Sparklets, Frost Queen	Fruits: Strawberries, raspberries, blackberries, youngberries, boysenberries, loganberries, peaches, apricots, cherries. Vegetables: Peas, beans, corn, spinach, asparagus, broccoli, brussels sprouts, cauliflower	Fiber cartons (transparent cellulose liner), 10 oz. to 10 lb. Fiber cartons vegetable parchment liner), 15, 30 lb. Tins, 30 lb. Barrels	.....	.....	.....	.....
Keystone Cooperative Grape Association North East, Pa.	Erie, Pa.	Keystone	RSP cherries, strawberries, currants, black raspberries, grape juice, cherry juice, red raspberries	Tins (slip cover), 30 lb. Barrels, 400 lb.	Cold storage	25,969 (Plus 270,000 gal. of juice)	115,000 (Plus 170,000 gal. of juice)	.....
Kingan & Co. Indianapolis, Ind.	Indianapolis	Kingan Fresh Frosted Tasti-Foods	Pork loins (whole), pork tenderloins, pork sausage material, pork offal, beef clods, rolls, butts, strips, tenderloins, offal	Trays enclosed in corrugated box, 5, 10, 30, 50 lb.	Birds Eye	.....	.....	.....
Kold Kist, Inc. 5329 E. Washington Blvd., Los Angeles, Calif.	Los Angeles	Kold Kist	Chicken noodle soup, vegetable soup, clam chowder, split pea soup, onion soup, chicken and noodles, beef stew, lamb stew, Swiss-style steak, spaghetti and meat balls, chili con carne, creamed chicken, fillet mignon, pot roast and brown gravy, sirloin tips and mushrooms. All items above are cooked, then packaged and quick frozen. Beef steaks (square, uncooked, with all sinews and excess fat removed). Rabbit (ready to cook)	Cooked foods: 20-oz. waxed cartons. Beef steaks: Wrapped individually in transparent cellulose, in 2-, 2½-, 3-, 4-oz. steaks. Whole rabbit in carton transparent cut-out on top)	Combination shelf coils and air blast	.....	107,000	250,000
Kruse's, Inc. 2253 Germantown Ave., Philadelphia, Pa.	Philadelphia; Norfolk, Va.; Plant City, Fla.; Nashville, Tenn.	None	Strawberries, peaches, raspberries	Cans, 30, 50 lb.; kegs, 10 gal.; barrels, 55 gal.	Public warehouses, zero to 30 deg. below	5,000,000	6,000,000	Probably same as 1941
Kulus Bros. Packing Co., Inc. Biloxi, Miss.	Commercial freezers, Biloxi, Ocean Springs, Miss.	Konisur	Headless shrimp	Waxed paper cartons, 5 lb.	.....	50,000	125,000	150,000
Lawtons Canning Co., Inc. Seneca St., Lawtons, N. Y.	Buffalo, N. Y.	Lawtons	Strawberries, black raspberries, red raspberries, currants	Enameled tins, 30, 50 lb. Barrels lined with paraffine, 55 gal.	.....	304,720	477,625	400,000

Little America Finer Frosted Foods Co. Jenkins Arcade, Pittsburgh, Pa. (Does no freezing)	None	Little America	Everything, with exception of meats	Containers, 10, 12 oz.; 1, 2½, 5, 15, 30 lb.	12,350,000	Air blast, Finnegan	17,850,000	17,850,000
Lockeport Co., Ltd. Lockeport, N. S., Canada	Lockeport, N. S. Yarmouth,	Seacap, Dory	Fish of all varieties, and byproducts	Cartons, 5 lb. Wooden boxes, 5, 10, 15 lb.	.....	Sharp freezer and air blast	.....	.....
Lone Star Fish and Oyster Co. 909 N. Staples St., Corpus Christi, Tex.	Corpus Christi	None	Shrimp	Cartons, 5, 10 lb	100,000	Zero temperature	100,000	150,000
Long Island Duck Packing Corp. Riverhead, N. Y.	Riverhead, Eastport, N. Y.	Various brands	Ducks, oysters	Wooden boxes	3,000,000	Birds Eye, "Z", own	4,500,000	6,000,000
R. I. MacLaughlin & Co. Box 686, Salem, Ore.	Beverton, Gresham, Ore.; Puyallup, Wash.	None	Strawberries, raspberries, blackberries, loganberries, youngberries, boysenberries, black raspberries	Barrels and cans	.....	Commercial freezing	6,569,930	About same as 1941
B. E. Maling, Inc. Hillsboro, Ore.	Hillsboro	Birds Eye	Asparagus, spinach, rhubarb, strawberries, peas, peas and carrots, red raspberries, youngberries, wax beans, green beans, lima beans, peaches, cauliflower, broccoli, brussels sprouts, squash, turkeys, RSP cherries, mixed fruit, mixed vegetables	Transparent-cellulose lined wax paper cartons, 2, 1, 2½, 5, 10 lb.	(Output included in that of Frosted Foods Sales Corp.)	Birds Eye		
Maplecrest Turkey Farms, Inc. Wellman, Iowa	Wellman	Maplecrest	Turkeys	Cry-O-Vac bags	280,000	Sharp freezer	288,445	270,000
Marine Products Co. Cor. Hancock & Harasthy Sts., San Diego, Calif.	Guaymas, Sonora, Mex.; Topolobampo, Sinaloa, Mex.	Ocean Garden, Cal-Sea	Shrimp, clams, sea bass	Waxed cartons, 5, 10 lb	.....	Sharp freezer, 45 deg. below zero	240,000 (Operation started June, 1941)	3,000,000
Samuel Martin Game Farm 605 Union St., Seattle, Wash.	Seattle, Wash	Wild Life in the Kitchen	Ringneck pheasants	Cans, 3 lb.; may use fiber cartons	.....	Sharp freezer Air blast	.....	.....



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FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1940 output (lb.)	1941 output (lb.)	Intended 1942 output (lb.)
Martin Orchards, Inc. Sturgeon Bay, Wis.	Custom freezers	Martin's	RSP cherries	Tins, 10, 15, 30, 50 lb. Barrels, half-barrels		2,000,000	2,500,000	2,500,000
Mavar Shrimp & Oyster Co., Ltd. Biloxi, Miss.	Biloxi, Ocean Springs, Bay St. Louis, Miss.; New Orleans, La.	Silvercrest	Fresh green headless shrimp	Cartons (pulpboard, wax covering), 5 lb.	Sharp freezer	150,000	225,000	300,000
L. C. Mays Co., Inc. 423 Gravier St., New Orleans, La.	Hammond, Independence, La.	Mayco	Strawberries	Cans, 30 lb. Barrels and steel drums, 450 lb.	Cold storage	394,904	754,704	750,000
William E. McIntosh Ave. E., Geneva, N. Y.	Geneva, Newfane, N. Y.	McIntosh, Green Top	Rhubarb, raspberries, strawberries, cherries, peaches, apples	Cans, 30, 50 lb. Barrels, 50 gal. Cups, 1 lb.	Sharp freezer	2,000,000	2,500,000	2,500,000
Missouri State Chickeries (Operating as Botz Chickeries) P. O. Box 510, Jefferson City, Mo.	Jefferson City	Botz Poussinette, Botz Poulette	Battery raised broilers, livers, giblets and necks	Corrugated cartons, wax lined, with liners of same material in summer	Botz Quick-Freeze	250,000 pieces	250,000 pieces	300,000 pieces
S. A. Moffett Co. 1331 Western Ave., Seattle, Wash.	Seattle, Mt. Vernon, Grandview, Tacoma, Wash.	Polar, Eskimo, Samco, Valley	Blackberries, cherries, currants, loganberries, boysenberries, red raspberries, black raspberries, strawberries, huckleberries, prunes, peaches, youngberries, gooseberries, asparagus, string beans, lima beans, broccoli, brussels sprouts, cauliflower, cut corn, corn on cob, peas, spinach, squash	Barrels (fir), 50 gal. Tins (inside-enameled), 5, 10, 15, 30, 50 lb. Cups, 1 lb. Cartons with transparent-cellulose liner; wax cartons with no liner	Air blast, 20 deg. below zero	28,000,000	20,468,703	25,586,000
Monmouth Beach Cold Storage Co., Inc. Monmouth Beach, N. J.	Monmouth Beach	Polar	Fish: Menhaden, bluefish, bonito, croaker, butterfish, herring, ling, mackerel (Boston, spike, thimble eye), porgies, shad, Lafayette, squid, white bone, weakfish, whiting	Wooden boxes, 110 to 125 lb., depending upon size of fish	Sharp freezer with fans	1,392,215	2,192,951	2,000,000
Monmouth Canning Co. 256 Commercial St., Portland, Me.	Portland, Me	Monmouth	Blueberries	Frozen fruit cans, 30 lb.	Sharp freezer, zero deg.	235,000	400,000	500,000
John C. Morgan Co. Traverse City, Mich.	Freezers rented		RSP cherries	Barrels and 30-lb tins		700,000	40,000	Pack on order only
Morton Canning Co., Inc. Morton, N. Y.	Morton	Morton	Red pitted sour cherries	Enamel-lined tins, 10, 15, 30, 50 lb. Barrels, 450 lb.	Finnegan	787,610	532,800	1,000,000
W. A. Munn & Co., Ltd. St. John's, Newfoundland	St. John's, Harbor Grace, Newfoundland	Munn's	Blueberries, cod liver oil					
Mutual Citrus Products Co. 424 South Atchison St., Anaheim, Calif.		M.C.P.	Citrus juices	Tins, 6-gal.				
National Chip-Steak Co. Merritt Bldg., Los Angeles, Calif.; 29 Central St., Cincinnati, Ohio	Los Angeles, San Francisco, Millbrae, Calif.; Seattle, Wash.; Portland, Ore.; Oak Park, Ill.; Philadelphia, Pa.; Cincinnati, Ohio; Buffalo, Albany, N. Y.	Chip Steaks	Meat only	Waxed cartons, 5 lb.	Frick sharp-quick freezer, 40 deg. below zero; ammonia sharp freezer, 15 below	2,500,000	3,000,000	3,000,000
National Frosted Foods Sales Corp. 110 Cliff St., New York, N. Y. (Does no freezing in own plants)		National	Cod fillets, haddock, flounder, ocean perch, scallops, shrimp, lobster meat	Cartons, transparent wrapper, 1, 5 lb.	Flexible froster and air blast	300,000	450,000	950,000
National Fruit Canning Co. 1720 West Spokane St., Seattle, Wash.	Chehalis, Seattle, Burlington, Wash.	Valamont, Tasteful	Strawberries, raspberries, cherries, blackberries, loganberries, boysenberries, peaches, apricots, peas, corn	Containers, 12 oz.; 1, 2½, 5, 10, 15, 30 lb.; 50 gal.	Finnegan	4,700,000	6,985,000	8,000,000
New England Fillet Co., Inc. 26 Boston Fish Pier, Boston, Mass.	Boston, Glouster, Mass.	Seacrest	Seafoods	Containers, 5, 10, 15 lb. Use both wood and cartons	Air blast, 16 deg. below zero	2,000,000	4,000,000	5,000,000
New England Fish Co. Spokane St. Terminal, Seattle, Wash.	Astoria, Ore.; Seattle and Kalama, Wash.; Eureka, Calif.; Boston, Mass.; New York, N.Y.; Ketchikan, Petersburg, Sitka and Juneau, Alaska; Vancouver, Butedale, Prince Rupert, B. C.	Nefco, Belleanna, Columbia, Imperial	Salmon, halibut, sole, shad, shad roe and other Pacific Coast fish (dressed and packaged fillets and slices)	Wooden boxes for whole dressed fish; cartons for fillets and slices	Birds Eye and sharp freezing, 30 to 50 deg. below zero	15,000,000	15,000,000	15,000,000
New York Frozen Foods Corp. 48 High St., Brockport, N. Y.; 312 Washington St., New York, N. Y.	Brockport	Nyffco	Cherries, strawberries, plums, peaches, currants, grapes, elderberries, red raspberries, black raspberries, prunes, blueberries, blackberries	Cans, 10, 15, 30, 50 lb. Barrels, 50 to 52 gal.	Sharp freezer, 30 deg. below zero		2,000,000 (First year of operation)	10,000,000
Nickerson Bros., Ltd. Liverpool, N. S., Canada	Liverpool	Mersey	Fish	Containers, 10, 15, 25, 50, 100, 200 lb.	Sharp freezer	3,000,000	3,000,000	3,000,000
Herbert A. Nieman & Co. Canneries Division, Thiensville, Wis.	Thiensville	Garden Spot, True Blue	Peas, carrots, corn, beets, peas and carrots	Containers, 12 oz., 2½, 5 lb.; bulk, 25 lb.; Cry-O-Pak, 30 lb.	Sharp freezer and air blast	1,645,000	2,060,000	3,000,000
Norfolk Berry Growers' Association Simcoe, Ont., Canada	Simcoe	Norfolk; also pack Birds Eye strawberries under supervision of Deerfield Packing, Ltd.	Strawberries, raspberries	White oak barrels, 50 gal.; tin pails, 23 lb.; white oak kits, 50 lb.; waxed cartons, 1, 2½, 10 lb.	Quick freeze	804,519	279,788	100,000

North Pacific Canners & Packers, Inc... 412 Railway Exchange Bldg., Portland, Ore. (Gresham Berry Growers, Springbrook Packing Co., Stayton Canning Co., Washington Canners Co-operative, Producers Co-op. Packing Co., Columbia Fruit Growers, Fruitland Canning Assn.)	Salem, Gresham, Springbrook, Stayton, Ore.; Vancouver, Wash.	Flav-R-Pac, Gresham	All berries and vegetables	Barrels; tins, 10, 15, 30 lb.; fiber cartons (transparent cellulose liner), 1, 2½, 5, 10 lb.	20 to 30 deg. below zero, air-blast and sharp freezer	.....	23,000,000	25,000,000
O'Donnell-Usen Fisheries..... 197 Northern Ave., Boston, Mass.	Boston, Gloucester, Mass.	O'Donnell Quality, Usen Brand, Taste o'Sea, Fish of the Day, Tower Brand	Fillets: haddock, cod, pollock, perch, mackerel, sole, flounders, hake, cusk, scallops, whiting	Cartons, 5, 10, 15 lb. Boxes, 10, 15 lb.	Air blast, 40 deg. below zero; quick freeze, 40 below	10,000,000	12,000,000	15,000,000
Olney & Carpenter, Inc..... Wolcott, N. Y., Eden, N. Y.	Wolcott, Eden, N. Y.....	O & C, 999.....	Peas, broccoli, brussels sprouts, peas and carrots, lima beans, green beans, wax beans, peaches, corn, asparagus, spinach, cauliflower, squash, cherries, strawberries, raspberries, rhubarb	2-piece Simplex for vegetables; 1-piece with transparent bag for 1 lb. and 3 lb. of fruit. Tin for 10 lb. and 30 lb. of fruit	Air blast.....	4,122,077	4,378,016	Same as 1941
O'Loane, Kiely & Co..... 1058 Hamilton St., Vancouver, B. C., Canada	New Westminster, B. C..	O. K.....	Blackberries, wild blueberries, cultivated blueberries, boysenberries, red currants, black currants, RSP cherries, gooseberries, loganberries, red raspberries, strawberries, asparagus tips, cut green beans, cut wax beans, cut kernel corn, corn on cob, peas, spinach	Waxed cups, 15 oz.; corrugated containers, wax paper lined, 5, 10, 20 lb.; tins, enameled, 15, 25, 30 lb.; barrels, fir, paraffine lined. Vegetables: Waxed cardboard patent coated containers, 10, 12 oz., 5 lb.	Air blast, 25 to 30 deg. below zero	.....	.....	.....
Omaha Cold Storage Co..... 8th and Farnam St., Omaha, Neb.	Omaha.....	Ocoma.....	Poultry.....	Institutional and retail packs	Air blast, 15 deg. below zero	3,000,000	10,000,000	10,000,000
Pacific Co-operative Union..... Mission City, B. C., Canada (Formerly Associated Berry Growers Corp.)	Hatzic, B. C.....	Pacific Co-operative	Strawberries, raspberries, blackberries, loganberries	Barrels, 40 gal.....	Sharp.....	.....	.....	.....
Paragon Packing Co..... Astoria, Ore.	Astoria, Portland, Ore...	Paragon.....	Halibut, salmon and all fillets.....	5-lb. bricks; 5-lb. packages, 20 lb. to carton, transparent wrapper	Sharp freezer, 10 deg. below zero	15,000	385,000	500,000
Paulus Bros. Packing Co..... Trade & High Streets, Salem, Ore.	Terminal Ice Co., Salem..	Blue Tag.....	Loganberries, currants, blackberries, strawberries, red raspberries	Barrels, 50 gal.....	Sharp freezer.....	6,000	202,680	.....
Pelican Cold Storage and Warehousing Co., Ltd. 1561 St. Louis St., New Orleans, La.	.....	.....	Fish products, crabmeat, shrimp.....	.....	.....	.....	.....	.....
H. F. Pelphrey & Son..... 1414 Lawrence St., Los Angeles, Calif.	Pasadena.....	Pel-freez.....	Rabbits.....	Paperboard.....	Air blast.....	10,000	25,000	100,000
Perry Brothers..... 2221 Western Ave., Seattle, Wash.	.....	.....	Chicken.....	Cartons with transparent window	.....	.....	.....	.....
Pleasant Grove Canning Co..... Pleasant Grove, Utah	Orem, Utah; Twin Falls, Idaho	Utah Valley, Alpine	RSP cherries, raspberries, apricots.....	Tins, 30 lb. Barrels, 50 gal.	.....	500,000	500,000	500,000
Pickett Cherry Farm..... Bellevue, Ohio	Toledo, Ohio.....	Pickett's.....	Cherries.....	Tins, 30 lb.....	Sharp freezer.....	200,000	300,000	300,000
Pony Brand Essence & Syrup Co., Ltd.. Industrielle Ave., Quebec, Canada	Quebec, Canada.....	Pony Brand.....	Strawberries, raspberries, peaches, blueberries, cranberries	Containers, 2 lb. Pails, 35 lb. Barrels, 50 gal.	Sharp freezer, Finnegan	265,000	290,000	About same as 1941
Pratt's Fresh Frozen Foods, Inc..... 513 W. 16th St., New York, N. Y.	.....	Pratts'.....	All varieties of vegetables and fruits, fish, meat, poultry	Tins, waxboard cartons, 10 oz.–30 lb.	Various systems used in different plants. All products are quick frozen	.....	.....	.....
Priebe & Sons, Inc..... 110 North Franklin St., Chicago, Ill.	Perry, Sac City, Iowa...	Priebe.....	Poultry (broilers, fryers, roasters, fowl, turkeys)	Retail: Waxed cartons, transparent wrapper. Institutional or bulk packages: Individual birds wrapped in vegetable parchment.	.....	.....	.....	.....
Producers Co-operative Packing Co..... Salem, Ore.	Salem, Ore.....	Flav-R-Pac.....	Strawberries and other berries.....	Barrels. Tins, 30 lb.....	Sharp freezer.....	120,000	150,000	250,000
Pure Fruit Juices, Inc..... 220 Bagley Ave., Detroit, Mich.	Los Angeles, Calif.....	Cold Gold.....	Orange juice, lemon juice.....	Tin cans, enamel-lined, 14, 30, 120 oz.	Finnegan rotary tubular sharp freezer, minus 10 deg	140,000	400,000	1,000,000 plus
Quality Col-Pak, Inc..... 450 Fernando Court, Glendale, Calif.	Glendale, Los Angeles, Watsonville, Calif.	Quality, Col-Pac, Kol-Pak, Dewkist	Youngberries, boysenberries, loganberries strawberries. (25 other fruits and vegetables are frozen for us in Northwest)	Wood boxes, wax lined; fiberboard boxes, wax impregnated or wax lined; tins; wax cartons, transparent bags, wax outer wrap	Sharp freezer, 26 or 30 deg. below zero	640,000	850,000	1,000,000
The Red Wing Co., Inc..... Fredonia, N. Y.	Fredonia.....	.....	Strawberries, cherries, raspberries, plums.	Barrels. Tins, 30 lb.....	Sharp freezer.....	.....	.....	.....
The Reidpath Co..... Richibucto, N. B., Canada	Richibucto.....	Diamond.....	Sea herring, mackerel, shad, cod, smelts, flounders, tomcods, eels. Strawberries, blueberries, cranberries	Boxes, 10, 15, 30, 50, 100 lb.; boxes of smelts, transparent wrapper, 2 lb.	Sharp freezer, 20 deg. below zero; holding rooms, 6 above	460,000	720,000	800,000

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1940 output (lb.)	1941 output (lb.)	Intended 1942 output (lb.)
Reynolds Brothers Sturgeon Bay, Wis.	Public storages, Milwaukee, Chicago, Minneapolis, etc.	Reynolds, Cherryland	Pitted tart red cherries	Tins, 30, 50 lb. Barrels, 450 lb.	Sharp freezing	750,000	2,150,000	2,000,000
Richardson & Holland, Inc 1001 John St., Seattle, Wash.	Seattle (cold storage plant)	R&H	Strawberries	Cans, 30 lb. Barrels	Sharp freezer	334,258	494,714	May not pack
Rockingham Poultry Market Co-op., Inc. Broadway, Va.	Broadway, Va	Rockingham, Shenvalley	Peaches, poultry	Peaches: Tins, 30 lb. Poultry: Boxes, ½-doz. size; barrels, 150 lb.	Air blast, 25 deg. below zero	None	2,430,000	4,000,000
Rocky Mountain Packing Corp P. O. Box 1618, Salt Lake City, Utah	Ogden, Utah	Twin Peaks, Snoline, Glenwood	Peas, limas, green beans	Wax cartons, transparent cellulose liner, waxed wrapper, 12 oz., 2½, 5 lb. Also some 10 oz., 1, 3, 4 lb.	Sharp freezing	756,000	913,000	1,000,000
Rood & McLean Fruit Products Westfield, N. Y.	Westfield; commercial storages in Erie, Pa.	Bulk packages only	Berries, cherries, grapes	Tins, 30 lb. Barrels, 50 gal.	Sharp freezer	112,800	960,000	Same as 1941
St. Johns Shrimp Co Patterson, La.	Cold storage, New Orleans	St. Johns	Shrimp	Cartons, 5 lb	Quick freezing		12,800	
Salter Canning Co North Rose, N. Y.			RSP cherries, strawberries	30-lb containers		176,000	43,000	
San Juan Fishing & Packing Co Foot of Stacey St., Seattle, Wash.	Seattle, Wash	San Juan	Fillets: Halibut, sole, cod, red rockfish, salmon. Also pack all these items as whole fish	5-lb., 10-lb. blocks, no package, 5-lb. cartons. Cartons contain 5 parcels; transparent wrapper	Sharp freezer; York air blast, 40 deg. below zero	5,000,000	6,000,000	7,000,000
Santa Clara Frosted Foods Co P. O. Box 222, Santa Clara, Calif.	Santa Clara	Year Round	Brussels sprouts, broccoli, asparagus, peas, apricots, lima beans	Simplex cartons, 10, 12 oz., 2, 2½ lb. Endfill cartons for free-flowing products. 25-lb. Cry-O-Pak. 30-lb. tins, enamel-lined	Air blast, 23 deg. below zero	Not operating	900,000	1,800,000
Sebastian Stuart Fish Co Spokane St. Dock, Seattle, Wash.	Juneau, Alaska; Seattle, Wash.; Attu, Aleutian Islands, Alaska	Taste-T, S&S	All varieties of western fish; salmon, halibut, ling cod, red cod, sole, black cod, silver smelts, trout, ink fish	5-, 15-lb. containers, in waxed paper and transparent cellulose	Sharp freezer		3,000,000	
Sky Bros Altoona, Pa. (Does not freeze in own plants)	Our private label is packed by General Seafoods, Boston, Mass.; John Dulany & Co., Fruitland, Md.; Swift & Co., Chicago, Ill., and others.	Skibo	Complete line of sea foods, fruits, vegetables, meats, poultry	Cartons, 10, 12, 16 oz., 2½, 5 lb. Tins, 10 15, 30 lb.	Quick freezing	1,480,000	1,828,500	2,165,000
Snider Packing Corp 40 Franklin St., Rochester, N. Y.	Marion, Ind.; Medina, Albion, Mt. Morris, Fulton, N. Y.; Houlton, Me.	Birds Eye, Snider	Peas, corn, green beans, wax beans, spinach, asparagus, broccoli, lima beans, strawberries, peaches, blueberries, cherries	Cartons with transparent cellulose liner	Multiplate Birds Eye frosters	(Pack included in that of Frosted Foods Sales Corp.)		
Sodus Canning Co Sodus, N. Y.	Sodus	Sodus	Cherries, raspberries	Tins, 10, 15, 30, 50 lb. Barrels, 50 gal.	Direct expansion	208,850	140,080	
Sodus Fruit Farm, Inc Sodus, N. Y.	Storage plants, Sodus, Williamson, Ontario, N. Y.	Sodus Fruit Farm, Inc.	Montmorency cherries, English Morello cherries	Paraffined barrels, 50 to 52 gal. Tin cans, enamel lined, 30, 50 lb.	Sharp freezer	1,316,529	1,362,424	1,573,097
Southern California Youngberry Growers' Assn 1807 E. Olympic Blvd., Los Angeles, Calif.	Los Angeles		Berries	Boxes and containers, 30 lb.	Air blast			
Southern Packing Co., Inc Foot of Fell St., Baltimore, Md.	Baltimore Cold storage plant	Sodalicious	Strawberries, peaches, pineapple, cherries, raspberries	Barrels, 30, 50 gal. Cans, 30, 55 lb.	Sharp freezer, minus 10 deg.			
Springbrook Packing Co. Cooperative Springbrook, Ore.	Springbrook	None	Strawberries, black raspberries, RSP cherries, rhubarb (all cold packed)	Tins, 15, 30 lb. Barrels, 50 gal.	Air blast	644,575	602,478	650,000
Standard Foods, Inc 729–731 S. 8th St., Louisville, Ky.	Louisville	Kentuk, Redyquik, Standards; private labels	Beef and pork products and byproducts	Fiber containers, 2, 4 lb., Pliofilm and vegetable parchment liners	Air blast	500,000	1,000,000	1,250,000
Stayton Canning Co. Co-op Stayton, Ore.	Freezing done at cold storage plant in Salem, Ore.	None	Strawberries	Barrels, 50 gal	Cold pack	869,146	838,575	850,000
A. L. Stewart & Sons Cherryfield, Me.	Cherryfield	Stewarts'	Blueberries	Boxes, 30 lb				
Suffolk Farms Packing Co Revere, Mass.	Revere	Suffolk Farms	Spinach, rhubarb, broccoli	Fiber container, 25 lb.; 14 oz., 2½, 5 lb. Peter style boxes. Pliofilm bags.	Air blast, 25 deg. below zero.	27,000	500,000	1,000,000
Sunshine Packing Corp. of Pa North East, Pa.	North East, Pa. Seasonal at Cleveland, Ohio; Greencastle, Pa.; Clintondale, N. Y.		Strawberries, cherries, red raspberries, black raspberries, blackberries, currants (red and black), crushed pineapple, peaches, apricots, eiderberries, gooseberries, blueberries, Columbian raspberries, grapes, prunes, plums and fruit juices of all kinds	Cans, 5, 10, 15, 30 lb.; barrels, 450 lb.; cartons, of all sizes	Sharp freezer	18,000,000 to 20,000,000 yearly		
Todkill & Chapman Wilson, N. Y.	North East, Pa.; Barker, N. Y.	T. & C.	Strawberries, raspberries, currants, brined sweet and sour cherries	Tins, lacquered, 15, 30, 50 lb. Barrels	Sharp freeze, 15 deg. below zero	1,177,000	2,485,252	2,500,000

Trans-Oceanic Fisheries, 2 Broadway, New York, N. Y.	New York, N. Y.; Capetown, South Africa; Galveston, Tex.; Biloxi, Miss.; Liverpool, N. S., Montreal, Canada; Manesquan, N. J.; Green Bay, Wis.	Clipper, Taf, N.B.C.; Mersey Loch Fyne, Tok, Trans O	Lobster tails, cod, haddock, flounder fillets, smoked cod fillets, kippers, mackerel, scallops, bluefish, shrimp, smelts, other seafoods	Cartons, 5 lb. Wooden boxes, 20 30 lb.	Birds Eye, "Z," sharp freezer	.....	.....	.....
Union Fisheries, Inc. Crawford and Bay St., Biloxi, Miss.	Our storage plants, Biloxi, Bay St. Louis, Ocean Springs, Miss.	Union, Deluxe, Gulf	Shrimp.....	Cartons, 5 lb.....	Quick Freezer.....	765,000	917,560	.....
Union Trade & Packing Co. Ketchikan, Alaska	Petersburg, Alaska..... (Public cold storage)	U.T.P.C.....	Salmon.....	Wooden boxes, 100, 200 lb.	Sharp freezer.....	130,000	20,000	100,000
Vashon Island Packing Co. Vashon, Wash.	Vashon, Wash.....	Vashon Island Packing Co.	Currants, boysenberries, gooseberries, strawberries, loganberries	Wooden barrels, 50 gal.; tins, 30, 50 lb.	Cold pack and sharp freezer, 18–20 deg. above zero	985,000	1,750,000	1,750,000
Ward & LeRoy, Inc. Belden Ave., Sodus, N. Y.	Sodus, cold storage plant	Ward & LeRoy, Inc.	Cherries.....	Tins, 30 lb.....	Air blast.....	1,240,000	570,000	1,000,000
Washington Frosted Foods 71 Spring St., Kent, Wash.	Kent, Ballard, Wash.....	Penguin, Green Bow	Strawberries, blackberries, raspberries, cherries, etc. Spinach, corn, broccoli, peas, peaches, cauliflower, brussels sprouts, asparagus	Cartons with transparent cellulose liner, waxed overwrap, 12 oz., 1, 2½, 5 lb. Cans, 10, 30 lb. Barrels, 50 gal. Cry-O-Pac bags, 30 lb.	Sharp freezer, air-blast, 3-stage system (Cahill), 32 deg., 10 deg., minus 10 deg.	1,900,000	2,100,000	3,100,000

Get the advice of the nearest Frick Refrigerating Engineer on how to solve your cooling problems.

No one would enter a battle with guns that wouldn't fire, or with machines that wouldn't run.

In the Battle of Production your equipment must also perform without failure. Hundreds of businesses and industries depend on refrigerating equipment as a vital part of their work. Warm weather, with its heavy loads—and overloads—will soon be here. Time now to have a checkup made of your cooling system.

A survey by a Frick Refrigerating Engineer will tell you not only what parts are dangerously worn, but whether you can save power, water, and labor by the use of up-to-the-minute equipment such as evaporative condensers and automatic controls. A few changes might materially increase the cooling capacity of your present system. And replacement parts are still available.

Be ready to fight hot weather! Get in touch with your nearest Frick Branch or Distributor now. They're in principal cities everywhere.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO PENNA. U.S.A.

1. Buy Defense Bonds.

2. Produce all war essentials with utmost speed.

3. Protect all perishable foods in process, in storage, in shipment—with dependable JAMISON-BUILT DOORS.

Consult nearest branch, or address

JAMISON COLD STORAGE DOOR CO.

Jamison, Stevenson & Victor Doors

HAGERSTOWN, MD. U. S. A.

JAMISON-
BUILT COLD STORAGE DOORS

Jamison Standard Track Door . . . Send for Bulletin 124.

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1940 output (lb.)	1941 output (lb.)	Intended 1942 output (lb.)
Washington Packers, Inc. Sumner, Wash.	Puyallup, Sumner, Wash.	Dewkist, Kol-Pak, Frost Kist, Frigid Fresh, West Farms, Charmed Land	Rhubarb, gooseberries, strawberries, loganberries, raspberries, black caps, R.S. cherries, black cherries, prunes, plums, youngberries, blackberries, huckleberries, blueberries, apples, squash, corn, peas, beans, peaches, spinach, asparagus, broccoli, cauliflower, lima beans, carrots, currants, apricots, brussels sprouts, peas and carrots	Tins, 5, 10, 15, 30, 50 lb. Barrels (fir), 50 gal. Cartons, 12 oz.; 1, 2½, 5, 10, 25 lb. Cartons have transparent cellulose bags or liners and waxed paper wrappers	Air blast, zero deg.	6,389,336	6,429,186	9,000,860
Waterman & Sons, Inc. Ontario Center, N. Y.	Ontario, N. Y.	Lake Shore	Cherries, berries	Barrels, 450 lb. Tins, 10, 15, 30, 50 lb.	Sharp freezer	600,000	500,000	700,000
Webster Canning & Preserving Co., Inc. Webster, N. Y.	Webster	Webster	RSP cherries and some strawberries	Tins, 15, 30, 50 lb	Sharp freezer	75,000	100,000	100,000
Wegner Canning Corp. Sodus, N. Y., Eustis, Fla. Sales Office: 100 Hudson St., New York, N. Y.	Sodus, Willimson, Wolcott, Ontario, N. Y.	Wegner	Cherries	Tins, 30, 50 lb	Quick freezing 40 deg. below zero			
E. A. Weilbacher Co. 1300 Factory Place, Los Angeles, Calif.		Finest Food	Apricots, peaches	All sizes, 5, 10, 20, 50 lb			No pack in 1941	
Wentzell Bros. Box 137, Biloxi, Miss.	Biloxi	W.B	Jumbo headless shrimp, cleaned picked shrimp meat, cooked peeled shrimp, fish, crab meat	Cartons, 5 lb. Cans, 1, 5 lb.	Sharp freezer, 40 deg. below zero	20,000	100,000	200,000
Westfield Planters Cooperative Fruit Products, Inc. Westfield, N. Y.	Westfield	None	Cherries, strawberries, peaches, currants, raspberries	Tins, 10, 15, 30 lb. Barrels.	Sharp freezer		100,000	
Whidby Island Berry Growers' Assn. Langley, Wash.	Langley, Wash	None	Strawberries	Tins, 10, 30 lb.; barrels, 50 gal.	Sharp freezer	250,000	275,000	300,000
Sherman White Packing Co. Fort Wayne, Ind.	Fort Wayne	Birds Eye	Ready-to-cook poultry	Birds wrapped in transparent cellulose	Birds Eye	(Output included in that of Frosted Foods Sales Corp.)		
Whiz Fish Products Co. 1525 Alaskan Way, Seattle, Wash.	Seattle	Whiz	Halibut, salmon, sole, sablefish, lingcod, smelts, perch, red rockcod	Solid fiber carton, 10 lb., with parchment liner	Sharp freezer	4,000,000	4,000,000	4,000,000
B. Wilson Co., Ltd. 536 Herald St., Victoria, B. C., Canada	Victoria	Wilson's	Green peas, green beans, lima beans, corn kernels, corn on cob, asparagus, strawberries, raspberries, loganberries, cherries, gooseberries, youngberries, boysenberries	Waxed board containers, 12 oz., 2½, 5 lb. Cups, 15 oz. Tins, 10, 25 lb. Cartons (dry pack), 20 lb.	Air blast tunnel, loose frozen, 15 deg. below zero	65,000	120,100	225,000
Witt's Med-O-Sweet Farm. Osseo, Minn.	Osseo	Med-O-Sweet, Osseo	Strawberries, raspberries, blueberries, cauliflower, rhubarb, cranberries, asparagus, green beans, poultry, fish, rabbits.	Tins, 10, 30 lb. Waxed board and Cry-O-Vac, 1 lb. Paperboard with waxed liners, 20 lb.	Sharp freezer and air blast	77,000	220,745	270,500
W. M. Wogman. R. I. Box 418, Sebastopol, Calif.	Cold storage, Sebastopol.	Amber Glow	Cider	Glass jugs, 1 gal	Slow freezing at zero		700 gal.	More than in 1941
D. H. Wright & Co. 7½ East Main St., Webster, N. Y.	Webster	Niagara	Strawberries, raspberries	Barrels, 450 lb. Tins, 15, 30, 50 lb.	Sharp freezer	400,000	450,000	500,000
The Zeropack Co. Cincinnati, Ohio		Zeropak	Apples, peaches, strawberries and other berry fruits	Tins, 10, 30 lb.				

FROZEN FOODS DIRECTORY SUPPLEMENT

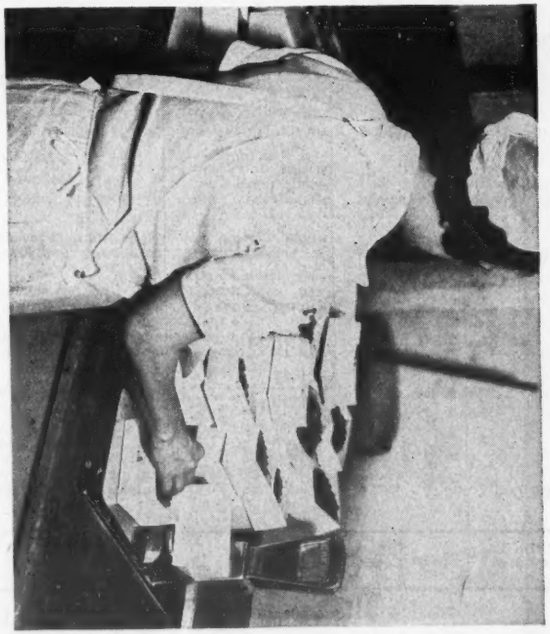
Information in this supplement is repeated from the 1940 Edition of the Frozen Foods Directory, no further information on the companies listed being available.

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
Bowes Co., Ltd. 76 Front St., E. Toronto, Ont., Canada	Toronto	Bowes	Strawberries, raspberries, cherries, blueberries, apples	Tin, wood containers (20 to 40 lb.)	Sharp freezer 10 deg. below zero	675,000	700,000	750,000
Brakeley Canning Co. P. O. Box 163, Bordentown, N. J.	Exmore, Va	Brakeley	Fruits, vegetables, sea foods	10, 12, 16, 40 oz.; 10, 15, 30, 50 lb.	Finnegan freezer "Z" system			
Citrifrost Distributors, Ltd. 2720 Pico Blvd., Los Angeles, Calif.	Pico, Calif	Citrifrost	Orange, grapefruit and lemon juices	Rubber hydrochloride bags (1 qt.) (Pliofilm)	Air blast	20,000 gal.	50,000 gal.	200,000 gal.
Coryell Commercial Center. Lincoln, Neb.	Lincoln, Neb	Coryell 70	Poultry of all kinds (meats for locker customers)		Sharp freezer, air blast, 20 deg. below zero	100,000	100,000	
Crown Packing Co. Grand Island, Neb.	Grand Island, Neb	Gilt-Edge	Pork, beef, veal, lamb, poultry, fancy meats, glands	30, 60 lb	Sharp freezer, 20 deg. below zero			
General Fish Corp.	Santa Cruz, Calif	CruZmar	All types of fish caught in local waters,	Cartons (5 lb.); whole fish,	Air blast		325,000	

General Fish Corp. Box 262, Santa Cruz, Calif.	Santa Cruz, Calif.	CruZmar	All types of fish caught in local waters, such as salmon, red snapper fillet, sardines, grayfish fillet	Cartons (5 lb.); whole fish, headless and cleaned, wrapped in kraft paper	Air blast	.....	325,000	.....
Gould Fruit Products. 480 Lake Ave., Rochester, N. Y.	Rochester, N. Y.	.....	Apples, cherries, raspberries, prunes, rhubarb, strawberries, blueberries	Cans (10, 15, 30 lb.)	Sharp freezer	About 400,000 a year		
Holley Canning Co., Inc. Holley, N. Y.	Brockport, Morton, N. Y.	Holley	RSP cherries, apples	Enameled tin cans (10, 15, 30, 50 lb.)	Sharp freezer, 20 deg. below zero	1,600,000	1,400,000	1,600,000
Hudson's Bay Co., Frosted Foods Division, Toronto, Ont., Canada	Halifax, N. S.; Ste. Martine, P. Q.; Simcoe, Ont.	Birds Eye	Asparagus, wax beans, broccoli, brussels sprouts, cauliflower, corn on cob, cut corn, peas, peas and carrots, spinach, squash, lima beans, blueberries, peaches, raspberries, rhubarb, strawberries, cod fillets, haddock fillets, halibut fillets, mackerel fillets, flounder fillets, halibut steaks, salmon steaks, lobster meat, scallops, shrimp, oysters	Cardboard carton, transparent-cellulose lined, greaseproof wrapper (10 to 16 oz.; 40 oz.)	Birds Eye	.....	.....	.....
A. & R. Loggie Co., Ltd. Loggieville, N. B.	Loggieville, Richibucto, Tracadie, Inkerman, Dalhousie, Shippegan, N. B.; Mulgrave, N. S.	Eagle	Blueberries, cod, haddock, mackerel, smelts, salmon, herring, swordfish, shad, haddock fillets, cod fillets, haddies, smoked fillets	Waxed-paper and parchment lined wooden boxes (15, 30); also 10, 25, 50, 100, 200 lb. boxes. Fillets, mackerel, salmon individually wrapped	Sharp freezers, zero to 20 deg. below	5,500,000 (Fish, 4,500,000)	4,790,000 (Fish, 3,900,000)	6,000,000 (Fish, 5,000,000)
Maple Ridge Cooperative Produce Exchange. Haney, B. C., Canada	New Westminster, B. C.	Maple Ridge	Strawberries, raspberries, blackberries	Barrels, fir (350 lb. net); tins (5, 15, 30 lb.); carton (1 lb.)	Sharp freezer	50,000	88,500	.....
Maritime-National Fish Ltd. Halifax, N. S., Canada	Halifax, N. S.; St. John, N. B.	Sea Seald, Maritime, Golden Ray, National, Sweet Brier, Sunrise, Bluenose	Haddock, codfish fillets; herring, mackerel soles, salmon, pollock, scallops, halibut, ocean perch	Cartons (5 lb.), wooden boxes (5, 10, 15 lb.) Transparent-cellulose and parchment wrapped)	Sharp freezer; also Birds Eye	8,202,922	9,777,639	6,855,070 (6 months)
The Marlyn Fish Co., Inc. Box 358, Ketchikan, Alaska	Ketchikan, Petersburg, Juneau, Sitka, Alaska	Marlyn	Halibut, salmon, sablefish	Wooden boxes (100 to 500 lb.)	Air blast	About 3,000,000 a year		
Metcalfe Foods, Ltd. Whitby, Ont., Canada	.....	.....	Asparagus, beans, corn, peas, raspberries, strawberries, loganberries, fruit	.....	.....	3,000,000	4,629,600	.....

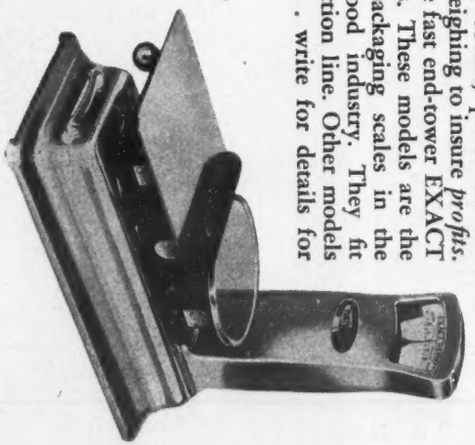
Exact Weight Scales

For Frozen Food Packaging...



High speed, EXACT WEIGHT Scale (counter-sunk) in a packaging operation at Frostkraft Packing Corp., San Francisco.

Guesswork carton filling is hazardous . . . invites overweight as well as underweight. For twenty-five years we have successfully demonstrated to food packers that packaging from bulk is best accomplished by sound, predetermined fraction ounce weighing to insure *profits*. Pictured here are fast end-tower EXACT WEIGHT Scales. These models are the most popular packaging scales in the Quick Freeze food industry. They fit most any production line. Other models are available . . . write for details for your plant.



EXACT WEIGHT Model #273 for tree ripened fruits, peas, beans, berries, asparagus, artichokes. Weighs in out-of-level position — Sensitive to ¼ oz, and capacity to 12 lbs.

Sales and Service from Coast to Coast

The Exact Weight Scale Company
21 W. Fifth Ave., Columbus, Ohio

INDUSTRIAL PRECISION SCALES

THERE IS NO SUBSTITUTE FOR EXACT WEIGHT

FROZEN FOODS DIRECTORY SUPPLEMENT

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
National Fish Co., Ltd. Halifax, N. S., Canada	Halifax, N. S.		All kinds of fish produced in its waters, such as haddock, cod, hake, pollock, soles, herring, mackerel, salmon, swordfish, smelts, flounders, skatewings, cod tongues, cod roe, scallops, large quantities of fillets of haddock and cod	All kinds, from individual waxed parchment and transparent-cellulose wrapper to cartons and wooden boxes	Own	About 7,000,000 annually		
Chas. Neubert Strawberry Co., Inc. 114 E. York St., Baltimore, Md.	Baltimore, Md.		Strawberries, peaches, blackberries	Tins (30 lb.); barrels (450 lb.)		More than 1,000,000 a year		
North Wind Packing Co., Inc. 2200 1st Ave., Seattle, Wash.	Seattle	Northwind	Peas, strawberries, cob corn, lima beans, green beans	Open-end carton with transparent-cellulose bag and waxed wrapper (12 oz., 2½, 5 lb.), tins (10, 30 lb.), barrels (50 gal.)	Shaker freezer with air blast, 10 deg. below zero (Frank Knoles-Baker Ice Machine unit)	300,000	600,000	1,200,000
Northwestern Frozen Products, Inc. 208 Columbia St., Seattle, Wash.	Seattle, Wash.	Kwikway	Peas, spinach, corn	Sulphite cartons, lined with transparent cellulose (2½, 5, 10 lb.)	Sharp freezer, 20 to 30 deg. below zero	None	100,000	300,000
O'Hara Bros. Company, Inc. 22 Fish Pier, Boston, Mass.	South Boston, Mass.		Fillets of haddock, pollock, cod, hake, cusk, redfish, sole, flounder, and mackerel	Wooden boxes (10 and 15 lb.)	Frick equipment for quick-freezing; temp. as low as —40 deg. F.	About 25,000,000 lb. fillets, 5,000,000 lb. whiting, mackerel a year.		
Oregon Fruit Products Co. Salem, Ore.	Salem	Oregon	Strawberries, loganberries, raspberries' youngberries, boysenberries, plums, cherries	Barrels, tins (5, 10, 15, 30 lb.), cups (1 lb.)	Sharp freezer, air blast	800,000	1,000,000	1,250,000
Orem Berry Growers, Inc. Provo, Utah	Utah Ice & Cold Storage Co.		Strawberries, raspberries	Barrels (50 gal.), cans		About 45,000		
Pacific Northwest Canning Co. Puyallup, Wash.	Puyallup, Wash., Salem, Ore.	No brand	Strawberries, red raspberries, loganberries, boysenberries, blackberries, RSP cherries	Tins, slip cover, enamel lined; barrels, fir, paraffine lined	Sharp freezer, 20 deg. below zero	450,000	350,000	500,000
Plancich Fish Co., Inc. 300 N. W. 13th Ave., Portland, Ore.	Portland, Ore.		Halibut, salmon	Each fish wrapped in paper, packed in boxes (100 lb. or over)	Sharp freezer, 5 or 10 deg. below zero	35,000	60,000	60,000
E. A. Smith & Co. 2323 Orleans St., Baltimore, Md.	Baltimore, Md.		Strawberries, black and red raspberries, blackberries, pineapples and peaches	Cans (10, 15, 30 lb.); barrels.	Sharp freezer	More than 1,000,000 a year		
South Fraser Farmers' Union New Westminster, B. C., Canada	New Westminster, B. C., Canada	South Fraser	Strawberries and all other varieties of berries, such as raspberries, loganberries, blackberries, red and black currants	Waxed paper cups (1 lb.); tins (15, 30 lb.); barrels (450 lb.)	Sharp freezer		272,250	Same
South Haven Fruit Exchange South Haven, Mich.	South Haven, Mich.		Strawberries	Tins (30 lb.); barrels (450 lb.)				50,000
Spencer Packing Co. 688 Third St., Lebanon, Ore.	Lebanon, Ore.	Spencerian	Strawberries, red raspberries, black raspberries, loganberries, youngberries, boysenberries, prunes	Tins (15 and 30 lb.); barrels (30 and 50 gal.)	Z process	282,600	1,234,000	
Sunnyside Ice & Produce Co. Sunnyside, Wash.	Sunnyside, Wash.	Polar	Asparagus	12 oz., 2½ lb	Sharp freezer, air blast at —10 deg.	32,000	150,000	
United Frosted Foods, Inc. 110 N. Franklin St., Chicago, Ill. (Distributors, not packers)	No plants	Four Winds	Green beans, lima beans, cut corn, cob corn, asparagus, spinach, broccoli, strawberries, red raspberries, peaches RSP cherries, boysenberries, blueberries, fillets of cod, haddock, ocean perch, sole; scallops, shrimp; broilers, fryers, roasters, turkeys; chopped steak, lamb chops, pork chops	Consumer size; also 2½, 5 lb. institutional	Air blast			
Waldport Sea Food Co., Inc. Box 617, Waldport, Ore.	Waldport	Waldport	Crabmeat	Tins, parchment lined (1, 5 lb.)	Sharp freezer	20,000	30,000	30,000
Washington Canners Coop. 507½ Main St., Vancouver, Wash.	Vancouver, Wash.	Bestwest, Flavorpac, Norpac	Strawberries, red raspberries, red sour cherries, black cherries, boysenberries, loganberries, youngberries, blackberries, blueberries, prunes	Tins (5, 10, 15, 30, 50 lb.); barrels (50 gal.); cups (1 lb.); packages (1, 2½ lb.); boxes, (30 lb.); cans (No. 10, 12)	Air blast, 10 deg. below zero to zero	2,000,000	3,000,000	
Washington Fish Co. 116 South "E." St., Aberdeen, Wash.	Aberdeen, Seattle, Wash.		Salmon, halibut, black cod			15,000	20,000	25,000

Advice on Package Problems Given at Conference

Speakers outline materials situation, tell how to save machinery, and discuss dried food packages

STANDING ROOM was the only available place in many of the meetings of the Packaging Conference of the American Management Association, Hotel Astor, New York, April 14-17, where the biggest attendance on record indicated the magnitude of the packaging problems of wartime.

That there is no predictable shortage of pulp or waste paper for the paperboard industry was the statement of Walter P. Paepcke, president, Container Corp. of America, and up to the present there are no priorities on these. There is ample paperboard to manufacture containers in quantities up to the mechanical capacity of the industry to consume them, which includes all war needs plus *essential* civilian needs. Civilian needs are rapidly diminishing because of the slowing down of whole industries such as the cosmetic industry.

Pointers on Machines

Six rules to follow to get the longest service from existing packaging machinery were given by H. H. Leonard, president, Packaging Machinery Corp., when he reviewed the packaging machinery situation. No new packaging machines can be purchased except by WPB orders. To meet their current needs, food manufacturers may be able to alter their old equipment. Priorities granted for repair parts manufacture are so low that there is no hope of replenishing the machine builders' supply, hence good deliveries are possible only for a few months more, and there is not much hope for a future improvement until the war is over. In order to keep existing machines in operation he suggested these rules:

1. Keep all repair parts in the storeroom under close care of the storekeeper.

2. Don't permit repair parts to be issued until old parts are examined to be sure they can no longer be used. Always repair the old parts if possible.

3. Keep machines in perfect adjustment, and keep them properly lubricated, especially gears and speed reducers.

4. Operators should be told of the current need for extra care to keep old machines going. There can be no new ones.

5. Study past repair records and then institute a bonus-payment system to operators for reduced maintenance.

6. Don't hoard repair parts; share them.

Dehydrated Foods

Packaging of dehydrated foods, a subject discussed by L. K. Harper, vice-president of Sardik Food Products Corp., was a subject that first filled the big ballroom to capacity. The tin can is the only container that embodies all the essential characteristics for dehydrated food packaging. Such a container must be: (1) moistureproof; (2) moisture-vapor proof; (3) grease proof; (4) odorless; (5) tasteless; (6) nontoxic; (7) insoluble in water; (8) able to hold a vacuum and permit gas packing; (9) of long life and great strength; (10) able to give maximum protection against changes in temperature.

For certain foods all these characteristics are necessary. For others, less perfect packages will be found fairly satisfactory for all but the most unusual conditions. No entirely satisfactory substitute has been found for tin, rubber or foil packaging.

In reviewing the wooden barrel situation, Leonard R. Steidel, president, Associated Cooperage Industries of America, Inc., urged that the manufacturer who desires to use barrels must keep in mind that about 120 days are needed to convert the standing tree to a wooden barrel, and that no large stocks of stave material can be kept on hand in anticipation of rush orders from users.

Significant Facts

Another session that packed the ballroom was a panel of the chief of the Containers Branch of the War Production Board, Douglas Kirk. Especially significant points brought out were these:

No satisfactory corrugated container has yet been developed for export. There are no priority ratings on paper, corrugated or solid fiber containers, and the situation in this field is getting

Wide World

OPPOSE LEWIS IN MILK INDUSTRY

Plans to oppose the entrance of labor leader John L. Lewis into the milk industry were made in Washington last month by members of National Council of Farmers Cooperative. Among the leaders fighting Lewis' drive to organize 3,000,000 dairy farmers are (left) H. E. Babcock, National Council president; Albert S. Goss, master of National Grange, and Edward A. O'Neal, of American Farm Bureau Federation.

easier. The container shortage of 1941 is not likely to be repeated for it was caused by forward buying. Now there are fewer civilian demands.

A shortage of wood, but not of wooden containers, is to be expected. Metal closures for glass must justify themselves as to the "essentiality" of their end purpose. They are essential if no other package is possible for the product. Small openings are favored over large openings needing metal closures. Black plate is favored over tinplate, but double-shell closures are not permitted.

The glass-container industry is now operating at 70 percent capacity, but the rubber situation is so acute that its availability frequently determines the possibility of use of glass where rubber gaskets are needed for the closure.

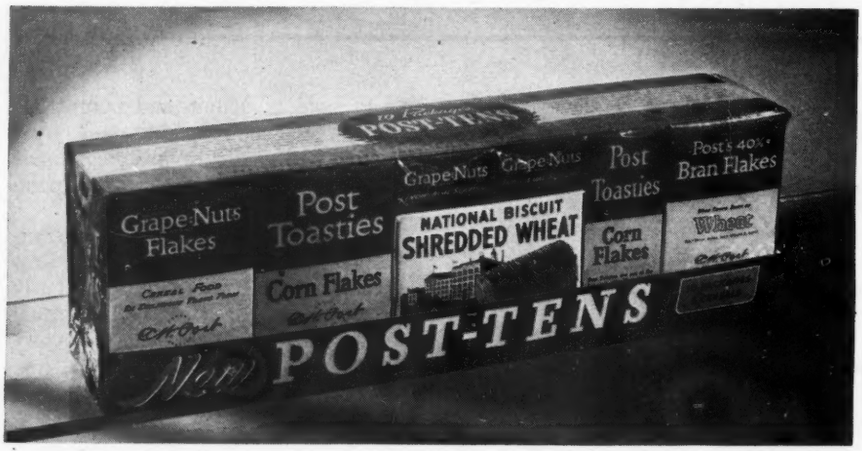
Rubber for vacuum packing cannot be permitted except for those foods that cannot be packed in any other manner.

Don't figure on buying any new packaging equipment.

The scarcity of burlap creates a greatly increased demand for barrels.

Cellophane is available only for the essential preservation of a product.

Any firm that expects to stay in a business that requires any critical material must fill out Form PD-25A under the Production Requirements Plan.



BEST FOOD PACKAGES OF 1941

Above are illustrated the food packages which won honors in the Packaging Awards of American Management Association. The Post-Tens package of General Foods Corp. received the top award among the 200 packages entered by all industries, making it the outstanding package introduced in 1941. The other food packages shown above received honorable mention, these including the wine foursome of Taylor Wine Co., Kellogg Co.'s variety package, California Packing Corp.'s glass container, Standard Brand's Tenderleaf tea-ball display package and Cascade Frozen Foods Jack Frost package.

Victory Program Planned by IFT

Wartime problems of food industries to be discussed at convention to be held in Minneapolis from June 15 to 17

"CONSERVE FOR VICTORY" has been adopted as the theme of the third annual meeting of the Institute of Food Technologists, to be held at the Hotel Nicollet, Minneapolis, Minn., June 15 to 17. The practical value of this program is indicated by the wartime demands upon supplies of strategic materials, ingredient commodities and packaging materials.

The program will include four half-day general sessions, two luncheon sessions and one round-table session. The schedule for the morning session on June 15 includes: (1) "The Role of Food Technology in War," Lt. Col. Paul P. Logan, Quartermaster Department; (2) "Review of Recent Developments in Food Technology," Dr. R. C. Newton, vice-president, Swift & Co.; (3) "Food Technology—Vital Factor in National Conservation," Dr. E. H. Harvey, director of research, Anheuser-Busch, Inc.; (4) "War Problems in Food Stock Pile Storage," Dr. J. C. Drummond, chief scientific adviser, British Ministry of Food.

The afternoon session on June 15 will be devoted to six papers on substitute materials for food processing. Dehydration of foods will be discussed in six papers in the morning session, of June 16, and the afternoon session will include five papers on packaging and materials.

At the luncheon session on June 15,

C. W. Stein, FBI, will talk on industrial sabotage, while at the luncheon on the next day N. W. Shefferman, Sears, Roebuck & Co., will discuss labor relations and the food technologist.

At the round-table discussion in the morning of June 17 the subject of discussion will be the educational requirements of food technologists. Industrial plant trips will be arranged for those not attending the round-table session.

In addition to President L. V. Burton's address, a feature of the evening banquet session in the evening of June 16 will be the presentation for the first time of the Nicholas Appert Medal Award sponsored by the Chicago section of the Institute.

Monochloracetic Acid Ban May Be Reviewed

As reported in Food Industries (page 71, February, 1941), the Food and Drug Administration ruled that no amount of monochloracetic acid was permissible in any food or beverage. That chemical was characterized as a poison which could not under any circumstances properly be employed in any quantity in anything intended for human consumption.

Petition has now been made for review of that case, and it is anticipated that some form of hearing, at least some informal proceedings, will be held to determine whether this material can properly be used in minute quantities.

Two Changes Sought In Jam Standards

To permit more flexibility in making jelly, preserves, and fruit butter, National Preservers Association requests reopening for modification of the official standards fixed by the Food and Drug Administration for these commodities. Two changes are asked, one restricting the standards somewhat, the other permitting somewhat greater label freedom.

The standards as now in force permit use of corn sirup up to half of the total solids of the sweetener employed for preserves or jelly. All of the sweetener for fruit butters may be of this type. The Association proposes that the amount permissible be restricted to 25 percent of the sweetener solids from corn sirup in the case of all of these fruit products. It is argued that such restriction is necessary to secure a product of the quality and identity which the purchaser reasonably expects under these names.

The Association requests also that no label declaration be required as to what sweetener is used within these limits.

LOOK AHEAD

It may save time and money on wrapping machinery

For WAR or CIVILIAN PRODUCTION

As you probably know, a backlog of orders for industrial machinery is already accumulating in many plants. One thing is sure—those who look ahead, anticipate their needs and get their orders in first, will be the first to get machines.

Another fact to bear in mind is that many types of *essential* production rate *war* or *civilian priorities.* Though our work on machines to supply our armed forces must come first, a priority will help us fill your needs.

Up to the present time, no changes have been made in our price structure—another good reason for acting now.

We will gladly study your packaging problems so that you may plan for machinery requirements or service to meet war or essential civilian needs. Our broad and intimate knowledge of conditions should enable you to make the right decision. We may even be able to show you how to meet new demands without additional machinery.

Put your problems up to our nearest office.

Solving problems built our business

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO
Mexico, D.F.: Agencia Comercial Anahuac, Apartado 2303
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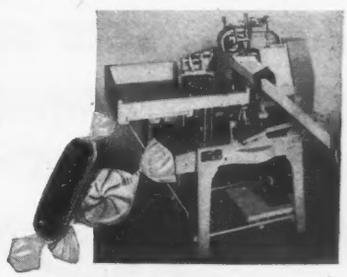
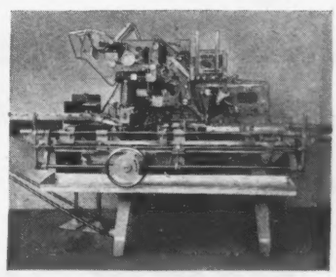
BANDAGES and food for our Army are being wrapped on our versatile FA model, which handles any type of material and is adjustable for a wide range of sizes.



TONS OF HARD CANDY for the Army are wrapped on our 22-B. One operator can wrap 150 pieces per minute.



SULFANILAMIDE for soldiers' kits is protected by a dust- and weather-protective wrap with easy-opening tape. The machine that produces this wrap is our CA-2, widely used for chocolate bars, headache powders, plug tobacco, etc.

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

NO MAGIC —ABOUT THE LONG LIFE THAT MOTOR USERS GET WITH WESTINGHOUSE CS MOTORS— SIMPLY SEALED SLEEVE BEARINGS.

..JUST ANOTHER REASON WHY WESTINGHOUSE MOTORS ARE YEARS AHEAD!

J-21234-A

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

War Production Board Orders

Production Requirements Plan—As a further step toward putting industry under the Production Requirements Plan, WPB announced on April 21 that it will soon discontinue granting preference ratings on individual applications for material to be used in general manufacturing operations. No individual application from a manufacturer for materials to be incorporated in his products over a period of more than a month will be approved.

As previously announced, virtually all industries requiring priority assistance are expected to apply under the Production Requirements Plan for the quarter beginning July 1. The producers must file a single application to cover all of their materials requirements for a calendar quarter.

Sugar—Under the sugar rationing plan, industrial users of sugar are entitled to 70 percent of their requirements for the corresponding month of 1941. This restriction applies to manufacturers of bakery products; cereal products; confectionery; frozen desserts; other dairy products such as condensed milk and cheese; preserves, jams, jellies and fruit butters; bottled beverages, flavoring extracts and sirups; specialty foods such as desserts' puddings' drink mixes, pickles, table sirups, mince meat, catchup, chili sauce, salad dressing, soups and tomato sauce.

Canners and packers may obtain quota-exempt sugar under Order M-55 in amounts needed for the first processing of fruits and vegetables. Sugar for secondary processing is not quota-exempt.

Rubber in Closures—Conservation Order M-119 prevents the use of any rubber product or compound for the manufacture of glass jar closures for more than 40 food products. These are the products:

Animal food, beefsteak sauce, candied fruits, candy, chili peppers, chow chow, chutney, citron peel, cocoa powder, coffee, corn on cob, flavoring extract, greens (including spinach, turnips, etc.), honey, macaroni, marshmallow topping, nuts, peanut butter, piccalilli, pickles (except home-style processed), pickled mangoes, pickled relishes, pickled sauces, potato products, powdered skim milk, salad dressing, sandwich spread (not including meat spreads), shortening, soups and chowders, spaghetti, spices, sweet potatoes, sirups (including only corn, cane, maple, molasses and sorghum), tea, turnips, vinegar, whole apricots, whole carrots, and whole pears.

Collapsible Tubes—Regulations completely prohibiting the use of collapsible tin tubes for foods were put into effect April 1 (Order M-115).

Canned Soup—Tin Conservation Order M-81 has been amended to limit the packing of condensed soups in tinplate after June 30 to certain specified kinds. These soups are chicken, chicken gumbo, chicken noodle, gumbo creole, consomme, bouillon, tomato, asparagus, spinach, fresh green pea, clam or fish chowder, Scotch broth, vegetable, vegetable-vegetarian, pepper pot, oxtail, mock turtle, country style chicken, corn chowder, beef, and vegetable beef. The amendment also provides that only No. 1 picnic or larger cans may be used, and that canners may use 100 percent of the tinplate used in the corresponding period of 1941 for packing forms of the soups requiring the addition of water or other liquids. Canners who packed these soups in "ready to serve" form in 1941 may use only 70 percent of the tinplate consumed for such purposes during the corresponding period of 1941. Until June 30 canners may not use more tinplate than they did for these soups in the corresponding period of 1941. Packaging of soups, broths and chowders other than those provided for by the amendment may not exceed 25 percent of the 1940 pack before June 30, after which date the packing of such products in tinplate is to be discontinued.

Canners Export Boxes—WPB on April 14 amended Supplementary Order M-86-a, which requires canners to set aside certain percentages of their 1942 pack for the Army. The amendment requires canners to provide themselves with the materials necessary to pack such canned goods adequately in export boxes. Such boxes may be nailed wood boxes, weatherproof solid fiber boxes or wirebound wood boxes.

Canning Machinery—Repair and maintenance materials for leased canning machinery takes the same preference rating as that for machinery that is owned outright. This was made clear in Interpretation No. 1 of Priority Order P-115.

Dairy Machinery—High priorities are made available to keep necessary dairy processing equipment in good operating order, in Priorities Order P-118, issued April 21. Rating A-2 is provided for materials needed for emergency repairs to avert spoilage. A-3 is provided for materials needed for normal repair, maintenance, operation or replacement. Neither rating is available for expansion.

Enamel on Closures—Conservation Order M-116 prohibits further use of enamel coating on the exterior surfaces of tinplate closures for glass containers, subject to certain exceptions. Reduction of the weight of the interior and exterior enamel coating on all closures for glass containers to not more than nine-tenths of the standard weight in 1940, wherever practicable, is also directed by the order. Manufacturers will still be allowed to coat container closures with enamel when required to protect lithographed printing if other means of designation on the container closure are impracticable, or where the closures are heat-sterilized for use with food products for human consumption.

Enamel on Tin Cans—Oils, lacquers, enamels, resins and gums shall no longer be used as exterior coatings on cans made of tinplate, unless the coating serves a particularly useful purpose, according to Conservation Order M-108. There are some exceptions.

Metal Caps—Production of tinplate crown caps for bottled beer and soft drinks is restricted after a four-week period by Conservation Order M-104, and tinplate closures are banned from containers for coffee, tea, tea balls, dry spices (except those containing salt, onion salt or garlic salt), candy and peanut butter. And cover caps made of

tinplate, designed as closures for tomato catchup, chili sauce and for home use jars of jelly, jam or marmalade may no longer be produced.

Air Conditioning, Refrigeration—Those seeking preference ratings in order to purchase air conditioning or commercial refrigeration equipment are urged by WPB to submit in detail all the information called for on application forms PD-1A. Sketchy information submitted to WPB has caused difficulty and delay in the appraisal of applications, and many applications have had to be returned to the applicants.

Food Machinery—New or used industrial machinery for use in the bakery, confectionery, or beverage bottling industries, or for packaging or labeling any product except canned fruits and vegetables, may now be obtained only where the WPB approves (Limitation Order 83).

Riboflavin Requirement Postponed by F&DA

BECAUSE of a shortage in the supply of riboflavin, F&DA on April 23 postponed the effective date of that requirement of the wheat flour and related products standards calling for addition of not less than 1.2 milligrams of riboflavin to each pound of enriched flour, enriched self rising flour, enriched bromated flour and enriched farina. Postponement is to April 20, 1943.

Press Association

LADY MILKMAN

Many jobs usually done by men will be performed by women for the duration. Here is an example, Cleveland's first lady milkman, Mrs. Sylvia Kral. Six feet tall and weighing 170 lb., she loads and delivers 340 quarts of milk daily while another woman looks after her two children. She works for Hillside Dairy.

These "EXTRAS" Cost You Nothing... *AND MAY SAVE YOU MONEY*

COMPLETE SERVICE

PERIODIC INSPECTIONS

LIABILITY INSURANCE

ALL SAFETY PRECAUTIONS

MOST EFFICIENT METHOD

BETTER RESULTS

From an Industrial Fumigation Engineer—located near you

TURN your pest control problems over to an Industrial Fumigation Engineer—and forget them!

He will assume complete charge—taking full responsibility.

Qualified by specialized technical training and long experience, the Industrial Fumigation Engineer knows insects and rodents; knows their habits, life cycles and how to control them under all conditions.

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Write us and we will gladly ask the Industrial Fumigation Engineer nearest you to call, make a survey of your conditions and needs, and submit his findings. This involves no expenditure on your part.

Liquid HCN is the fumigant of choice with Industrial Fumigation Engineers throughout the country. Its remarkable killing power, cleanliness in use, and surprisingly low cost permit complete pest control with greatest economy. Write for full information on the advantages to you of Liquid HCN.

INFESTATION COMPLAINTS ENDED, COSTS REDUCED BY 50 PERCENT

● By calling in the specialized services of an Industrial Fumigation Engineer, a leading meat packing plant eliminated all complaints of infestation. In addition, the plant manager was able to show a saving of over 50 percent in fumigation costs. Well-planned use of Liquid HCN was responsible for this outstanding job.

American Cyanamid & Chemical Corporation

INSECTICIDE DEPARTMENT

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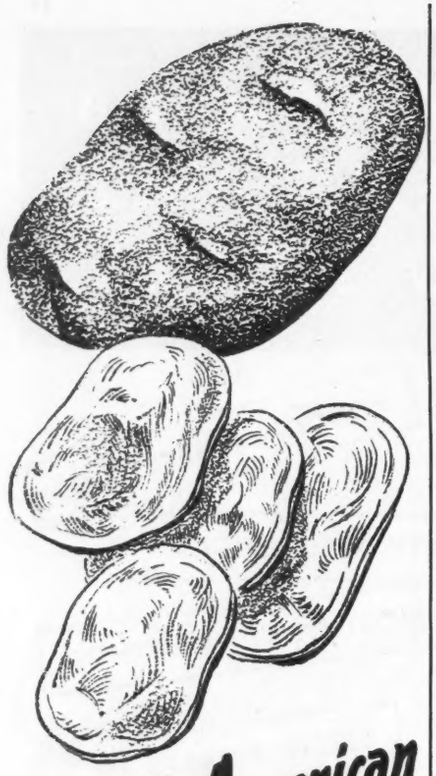

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Everything about the humble spud and its profitable little offspring—potato chips—is as American as "Yankee Doodle". And all materials that go into their manufacture are found in abundance right in this country. Also the most modern and economical method of producing our top quality potato chips is an American invention.

FERRY

CONTINUOUS POTATO-CHIP MACHINES

You simply fill hopper with raw unpeeled potatoes, "press a button and we do the rest"! Out of the adjustable delivery chute comes a stream of uniformly perfect chips—crisp, dry, tender, and salted to the Queen's taste . . . hour after hour, day after day the product of a Ferry Machine never varies from top quality—no rancid chips, no soggy ones. And, better yet, production costs are far lower than with other methods of manufacturing . . . Made in 5 sizes to suit your needs, with capacities from 60 to 350 lbs. of chips per hour. Write us today for illustrated catalog.

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Pointers on Dehydration Given by Technologists

Blanching and packaging stressed at symposium sponsored by American Institute of Nutrition

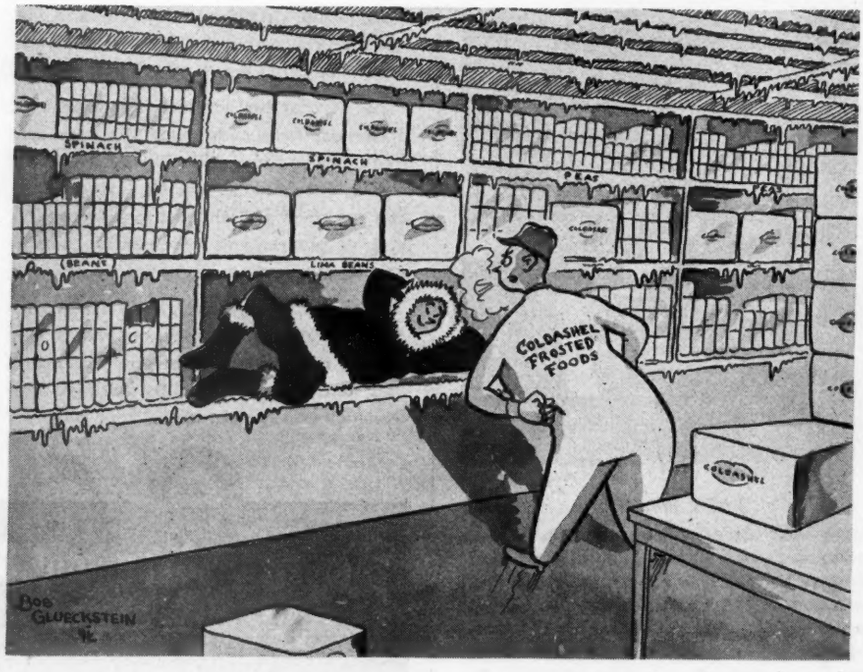
COMPLAINING of the losses of vitamins from dehydrated vegetables during processing, storage and preparation for eating, Col. Paul E. Howe of the medical department, U. S. Army, told listeners to the symposium on dehydration, American Institute of Nutrition, at Boston, on April 1, that carotene, ascorbic acid and thiamin were the most difficult food factors to retain. But he expressed the belief that proper packaging would aid in retaining the carotene and ascorbic acid. He urged that all packages for the Army be marked with the date of production so that it would be possible to compute the residual nutritive factors after a given time in storage.

Widespread use of dehydrated vegetables, low in vitamin C, by civilians might easily become a health problem if they followed customary dietary patterns, Colonel Howe stated. And in view of this he suggested that wide use of frozen foods might be a proper solution to feeding the civil population in war. Dehydrated vegetables, he declared, should retain palatable quality for at least a year and the processor must make good on his responsibility.

Prof. E. M. Mrak, University of California, described the technology of dehydration. Only raw materials high in sugar can be sun dried; others require dehydration. But if dehydrating temperatures are too high, the product goes off flavor, darkens and loses some vitamins. There is a critical temperature for every product above which occurs actual destruction of food factors. After reviewing the many types of equipment in use on the West Coast, he pointed out the correlation of design of dehydrators with the specific inherent qualities of raw materials. Products like apples which lose water easily must be dried in shorter tunnels than those like prunes which lose water more slowly. Otherwise, too long a tunnel will condense water on incoming raw material instead of dehydrating it. Direct-fired tunnels in which the prepared vegetables come in contact with products of combustion of natural gas are gaining favor in California. Storage temperatures, he said, were very important and for fruits should be below 70 deg. F.

Canadian Practice

Canadian practice in vegetable dehydration was described by H. C. Aitken of the Dominion Agricultural Experiment Station, Kentville, N. S., whose paper is presented elsewhere in this issue of FOOD INDUSTRIES (page



"Who did you say rented that shelf to you?"

41). Discussion brought out the fact that the exact relative humidity of the finishing, or the secondary end of a hot-end loading system, "is very, very important." Preprocessing or blanching of vegetables is absolutely necessary—the hot-water blanch for potatoes and carrots; the steam blanch for cabbage and turnips, the latter requiring six minutes in live steam. Packaging in metal containers in an inert gas (carbon dioxide or nitrogen) is necessary for dehydrated cabbage, carrots and turnips. Government purchases require a double evacuation and filling with the inert gas.

Blanching Necessary

Dr. D. K. Tressler, New York State Agricultural Experiment Station, also emphasized the need for blanching all vegetables to be dehydrated, except garlic, onions and peppers. Unless the enzymes are inactivated, oxidative enzymes will cause complete loss of vitamin C and carotene, even in the unprocessed state. Blanching must be done at 180 deg. F. to make a product that will keep. Over-blanching in hot water will cause the loss of vitamin C, but the loss is by leaching and is not by destruction. Carotene (pro-vitamin A), being barely soluble in water, does not suffer correspondingly. To test the adequacy of the blanch, test either for the peroxidases or catalase. The longer the water blanch the greater the amount of solution of the water-soluble vitamins.

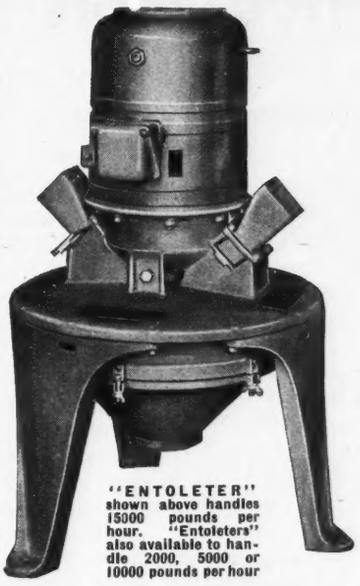
Prof. C. R. Fellers, Massachusetts State College, pointed out that it is as possible to over-wash a vegetable as to over-blanch; one-half the iron in raw spinach can be washed out.

One speaker from the audience, commenting on the excessive losses of vitamin C from dehydrated potatoes, claimed that the mere act of grating raw potatoes or apples will cause them to lose all their vitamin C! Furthermore, he continued, the act of mastication in the human mouth will cause raw potatoes and apples to lose half their vitamin C.

Dietary Foods Must Meet Standards

CONSIDERABLE pressure has been exerted by two groups to secure postponement of the effective date for standards for dietary foods. Varied arguments have been presented to Administrator McNutt and the F&DA staff. During mid-April it was definitely decided that there was no need for such postponement beyond May 18. Hence, the special label requirements for this class of foods must be met from that time or goods are subject to seizure for adulteration or misbranding.

Preserve Food for Victory



"ENTOLETER" shown above handles 15000 pounds per hour. "Entoleters" also available to handle 2000, 5000 or 10000 pounds per hour

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Food Spoiled by **INSECTS** *is ammunition* **WASTED**

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★ ***100% of any insect eggs*** ★

or other forms of insect infestation which may be waiting to ruin both your product and your reputation.

Actual plant operating records and certified Laboratory tests offer conclusive evidence that the "ENTOLETER" method of total destruction is 100% efficient.

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Government Approves Delivery Service Pools

Dairies urged to combine local deliveries to save tires and trucks. Same applies to bakeries

SIX WEEKS ago the Office of Defense Transportation and the Department of Justice made public a joint statement that plans to pool local delivery services could be submitted for clearance as to their legality under the antitrust laws. This measure was taken in an effort to conserve tires, trucks and delivery equipment generally.

The first announcement was followed up a week later with a request from ODT for cooperation from management and labor to put the plan into effect in the retail distribution of milk. At that time it was again stated that moves made according to the ODT plan would not be prosecuted under the antitrust laws. The attitude of the Department of Justice was further clarified as to what is cooperation and what is conspiracy when Thurman Arnold wrote a letter on the subject. Among other things Mr. Arnold said:

". . . The broad test of conspiracy is whether the combination is designed to restrict production, to raise prices, to interfere with distribution, or to drive competitors out of business.

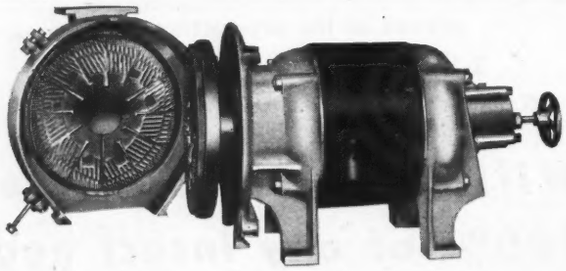
"For example, a number of milk companies are now pooling their resources to concentrate milk delivery. Such cooperative programs are perfectly reasonable as long as they are designed to save rubber. If these milk companies collectively advanced prices or concertedly excluded other distributors from the pool, however, the combination would become a conspiracy. A delivery pool, for instance, might provide an outlet for the brands of the major companies but not for the brands of an independent producer. In such an event, the costs of the independent would soon become substantially higher than those of his competitors. His equipment, once worn out, could not be replaced, and he would be forced to discontinue deliveries. To collectively deprive a competitor of the right to use a joint system of distribution would be to exclude him from the market. The Antitrust Division would view such a combination as a conspiracy in restraint of trade."

At about the same time Thurman Arnold made his statement the Baking Advisory Committee and the Dairy Industry Advisory Committee recommended programs for the baking industry and the ice cream industry.

Both programs have the blessing of the Office of Defense Transportation and both have as their goal the conservation of the industries delivery equipment through the elimination of special deliveries and similar extra service. Local groups will now have to meet and following the lines recommended formulate plans to suit local conditions. It is only through the action of the local groups that the desired cooperation between companies can be achieved. The local programs should be sent to ODT to clear through the Justice Department.

Nutrition Foundation Will Grant Awards

THE Nutrition Foundation, Inc., recently organized with the support of the food industry, will make its first series of grants to promote research and education in the science of nutrition on



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HERE'S WHY: It was designed by engineers who have been solving grinding problems for 30 years. . . . It is ball-bearing throughout and equipped with a built-in, totally enclosed, fan cooled motor. . . . Its hard iron grinding plates are easily cleaned and can conveniently be renewed at small cost. . . . Its capacity varies from 600 lbs. per hr. on very fine grinding to 2500 lbs. per hr. on coarse reductions. . . . It is quiet, vibrationless and exceptionally versatile.

As the first step toward putting one or more of these Junior Disc Grinders to work in your plant—write us today for Catalog 36-E which illustrates and describes them in detail.

ROBINSON MFG. COMPANY

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SCHEDULE OF EVENTS

MAY

1– 2—Conference on Dehydration, to be held at Agricultural Hall, University of California, Berkeley, Calif.
3– 6—Southern Bakers Association, annual convention, Biltmore Hotel, Atlanta, Ga.
18–20—Flavoring Extract Manufacturers Association of the United States, Hotel Pennsylvania, New York, N. Y.
18–22—American Association of Cereal Chemists, annual meeting, Edgewater Beach Hotel, Chicago, Ill.
21–23—Rice Millers' Association, Arlington Hotel, Hot Springs, Ark.
25–27—American Society of Brewing Chemists, annual meeting, Netherland-Plaza, Cincinnati, Ohio.
26–28—Biscuit and Cracker Manufacturers Association, Chicago, Ill.

JUNE

1– 5—Association of Food and Drug Officials of the U. S., Pennsylvania Hotel, New York, N. Y.
7– 9—Certified Milk Producers Association of America, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J.
8–11—National Confectioners Association, 59th annual convention, Waldorf-Astoria Hotel, New York, N. Y.
15–17—Institute of Food Technologists, 3rd annual meeting, Nicollet Hotel, Minneapolis, Minn.
18–20—Southern Wholesale Confectioners Association, Edgewater Gulf Hotel, Edgewater Park, Miss.
22–25—American Dairy Science Association, annual summer meeting, Michigan State College, Lansing, Mich.
20– July 1—National Dairy Council, Edgewater Beach Hotel, Chicago, Ill.

HEADS USO WAR FUND

James A. Farley, chairman of the board of Coca-Cola Export Sales Co. and former U. S. Postmaster General, has accepted the chairmanship of the National Corporations Committee of the USO War Fund Campaign. The USO will launch, on May 11, a nation-wide appeal for $32,000,000.

July 1, 1942, according to George A. Sloan, president. Grants made by the Foundation will go to established institutions in the United States and Canada.

In awarding the Foundation's first Grants-In-Aid this July, the Committee will give primary consideration to problems of critical importance in the war emergency. The advice of government agencies will be sought in relation to war emergency grants. Some grants will also be made in the support of nutrition projects in immediate relation to public health. The Foundation's long-range program, however, is concerned with basic studies and exploratory research to lay the foundation for better health and scientific guidance in the food industry of tomorrow. Although war considerations are now of first importance, these long-time intensive projects are also necessary to train men for key positions in science and industry.

Canners Install Dehydrating Equipment

Two canning plants will install Cowan dehydration units in the near future. Wegner Canning Corp., Sodus, N. Y., will dehydrate fruits and vegetables with this equipment, while Maine State Packing Corp.'s Boothbay Harbor plant will dry potatoes. The dehydration units operate on the continuous-belt principle and process from a ton to a ton and a half of raw material an hour. The Cowan process is the invention of H. W. Cowan, Canadian consulting engineer.

Why more food plants are changing over to Oakite Cleaning

effectively sanitary ... icidal treatment of ... whether it is ... peas or ... be of ... condi- ... amination ... teria, yeast, ... packing opera- ... packing of sub- ... oduction of fancy ... shed products when ... ay more than offset ... products.

In addition ... complete spoilage of the product with its ... that invariably result should spoiled products reach the ..., the manfacturer's reputation and prestige as a packer of quality products is seriously endangered.

FOOD PROCESSING EQUIPMENT GIVES LONGER SERVICE!

Conservation today is of FIRST importance in maintenance of equipment. It is why any idea, method or material that helps make it last longer is NOW the BEST . . . and ONLY policy.

Don't for example, take chances with abrasives that wear away surfaces of expensive equipment . . . don't use harsh alkalies that pit or corrode aluminum, or harm galvanized, tinned or glass-lined surfaces. PLAY SAFE . . . use Oakite cleaning materials specially designed for this work that remove deposits easily, speedily . . . and do it SAFELY! Remember . . . the RIGHT cleaning material, plus the RIGHT method of application . . . will definitely help your equipment give longer service!

Easier Quality Control On Government Orders

Whatever product you are packing for Government, lend-lease or civilian needs . . . vegetables, fruits, meats, fish, frozen foods, milk products, syrups, sauces, soups . . . let us show you how Oakite cleaning materials can also HELP YOU maintain QUALITY CONTROL standards more easily, speed-up essential sanitation procedures, secure IMPROVED cleaning results at less cost. Write today . . . no obligation.

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J-21235-A

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.

Tin Supply Sufficient For Essential Needs

NEW production of tin to 90,000 tons a year, plus curtailment in yearly use of current supplies to approximately 125,000 tons (1941 use was 175,000 tons) should cover the essential needs of the United Nations for a four year period.

According to the Tin Producers Association, London, the smelter capacity of the United Nations is sufficient to handle available supplies of concentrate from mines in Bolivia, Nigeria, Belgian Congo, the United Kingdom, Australia and other sources. The United Nations' stockpile of tin, estimated at 150,000 tons, will make up the difference between production and consumption.

No More Refrigerator Cars

No further construction of refrigerated railroad cars is contemplated in the Office of Defense Transportation-War Production Board program for the remainder of 1942. WPB's Requirements Committee has agreed to allocate materials for 18,000 freight cars and 300 locomotives during the remainder of this year, none of which will be for refrigerated cars.

CAPITAL VIEWS

FUEL SHORTAGE—This time it is really true! There will be a very real shortage of all kinds of fuel next winter unless some near miracle is performed to save the situation. Food plants in at least 17 states will go on short rations for fuel oil, or perhaps get none at all. Those who do not build a big reserve coal pile, or have their local dealer do it for them, may also be seriously affected next winter. In the case of all fuels, the shortage is not in available material. The difficulty is in getting it delivered where needed.

FOOD ADMINISTRATOR—Even high officials of Washington now realize that some overall planning for food is necessary. But the President has not picked the new food administrator, or whatever we will finally call him. Several important New Deal factions are trying to grab off this juicy plum of political preferment. The decision may have to come sometime in May. The longer it is deferred, the worse will be the mess which the new food czar will have to clean up.

ANTITRUST EXEMPTION—Many industrialists have greatly exaggerated the President's promise that antitrust cases will not be prosecuted where they interfere with war effort. The Department of Justice is going to take a firm stand for prompt action in these cases whether they involve charges of illegal monopoly or price fixing. Only when the War Department or the Navy Department can make a good case will delay in court proceedings be granted. The unofficial guess in Washington is, therefore, that the cheese industry will have to stand trial in Madison since cheese making is not considered a vital war industry, important though it be for Lease-Lend. Certainly no one can find any shred of persuasive evidence that trade agreements previously taboo are now permissible. Cooperation on war projects is not only permitted; it is encouraged. But that privilege does not extend to any of Trust Buster Arnold's pet hates.

DELIVERY POOLS—Doubling up of delivery services for food distribution is going to be necessary. Those making local retail deliveries or wholesale deliveries to retail stores must consider this means for saving gasoline and tires. Where a plan requires agreement between potentially competitive firms, it is strongly recommended by Washington observers that written approval be sought from Office of Defense Transportation. With such approval a plan avoids the criticism of being in violation of antitrust laws.

LATIN FOOD IMPORTS—More imports of Latin American foods, even those competitive with American agriculture, should be expected during the next year or two. The only restriction on an all-out Hemisphere trading plan is the fact that there are not enough ships to bring purchased foods to the United States. Otherwise, the Board of Economic Warfare would finance much of South American economy by buying great quantities of agricultural materials. In at least one or two cases purchases are to be made even though it is evident that the goods bought may have to remain indefinitely in storage in the country of origin.

WAR PRODUCTION—The most serious brake on war production now is shortage of raw materials, notably metals. Therefore, if it is humanly possible to do so, even the most essential manufacturing, including war plants, must get along without new machinery or new construction. Every available ton of steel, copper and other metals must go into the war goods themselves, not into plants to make them.

RATIONING—Delay in rationing sugar was partly caused by difficulty in getting the plan started. Also significant are the uncertainties as to how much sugar will be available for distribution. A little later, after the plunge has been taken on sugar, there will be a half-dozen other commodities distributed to the general public by some ration-card technic. Pork is talked of as the first item to follow sugar. Fats and oils will come later, but perhaps not until the very end of 1942. No one knows what else may be added to the ration lists much sooner as the tremendous demands of our Lease-Lend patrons deluge Washington.

Cooperative Nutrition Promotion Planned

A National Nutrition Plan of Cooperation was announced late in April by the Office of Defense Health and Welfare Services, Federal Security Agency, Washington, D. C. The basic idea of this plan is to acquaint the public with the principles of proper nutrition by means of a paid advertising campaign in which the government, food processors, wholesalers and retailers participate. The government has prepared advertising incorporating the official "food rules," with a set of conditions under which the material can be used by the firms donating space.

Laboratory License Needed

ANY research laboratory or analytical control laboratory which uses certain explosive ingredients must get a license from the U. S. Bureau of Mines before it can purchase, hold or use such materials. The list extends to several commonly used chemical reagents. Thus, hundreds of laboratories will be involved. In fact, few laboratories will escape.

CORRECTION

Bottom Vents for Vertical Retorts

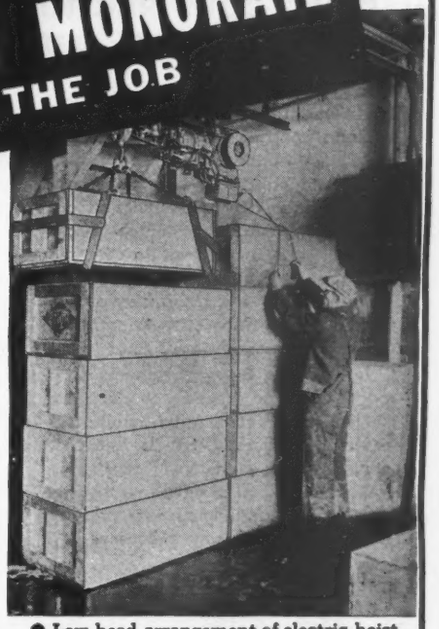
IN THE preparation of the manuscript for the article, "Bottom Vents for Vertical Retorts," FOOD INDUSTRIES, March, 1942, a few words were omitted. On page 42, the first paragraph of the discussion of Test 4 should read as follows:

"**Test 4—Automatic Bottom Venting by Combination Float and Thermostatic Trap.** Steam was admitted at the top of the retort. Bottom venting was accomplished by means of a combination float and thermostatic trap. Petcocks on the drain line and *the thermometer well were open throughout the test. The results of this test were similar to Test 3A where the steam trap closed on too high a temperature differential between steam and condensate. Here again the retort* thermometer reached 240 deg. in a little over nine minutes but temperature and pressure agreement were not reached until several minutes later. Venting by means of this trap was, therefore, not adequate, probably due to the inadequate capacity of the thermostatic vent and the fact that it closed under too high a temperature differential."

(The words in italics are the ones omitted.)

● Straight-line handling from tank to tank keeps costs low in this small cannery.

NO Production DELAYS WHEN AMERICAN MONORAIL IS ON THE JOB



● Low head arrangement of electric hoist permits high stock piling.

WITH American Mono-Rail Equipment you not only avoid using skilled labor for handling operations, but you also release floor space for more profitable use. Furthermore, this equipment permits accessibility to machines through narrow alleys. Machines may be grouped so that products requiring more than one operation can easily and rapidly be transferred from one machine to another.

Let an American MonoRail Engineer show you the possibilities that this equipment offers in eliminating production delays—cost reducing possibilities and the surprisingly low cost of installation and operation. There is no shut down or delay during installation.

★ ★ ★

Write for BLUE BOOK illustrating hundreds of MonoRail installations.

THE AMERICAN MONORAIL CO.

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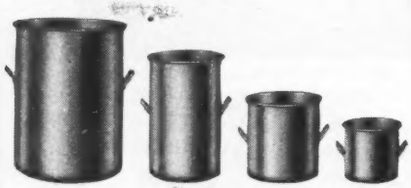
SEAMLESS STEEL CONTAINERS

HACKNEY CONSTRUCTION ASSURES LONGER LIFE

In these days of material shortage, it is necessary to make equipment last as long as possible. Hackney Seamless Steel Containers, used for handling and storing requirements, last longer than ordinary containers. They're cold drawn to shape—not a weld or joint in their entire construction. The bottom is reinforced with wearing ring. As a result they are exceedingly durable—able to stand up under exceptionally hard use.

In addition, they provide good appearance—and are easy to clean and keep clean. Food product manufacturers are using them for holding food stuffs, liquids, chemicals, ice, etc., as well as for food scraps . . . and departmental handling of raw products during manufacturing processes.



These sturdy, easy-to-clean containers are made in various capacities. Write for full details today . . . see how Hackney Steel Container advantages can benefit your plant.

Hackney

PRESSED STEEL TANK COMPANY

General Offices and Plant:
1457 S. 66th St.,
Milwaukee, Wisconsin

Containers for Gases, Liquids and Solids

Ice Cream Sales Rise As Income Increases

WHILE ice cream should not be considered as a luxury food or a non-essential because of its useful function as a balance wheel in dairy industry economy, its use bears a definite relation to the size of the national income. For this reason, the ice cream industry looks for at least a 10 percent increase in sales in 1942, in spite of difficulties in the supply of sugar, vanilla and other raw materials.

In 1928 and 1929, when national income was around 80 billion dollars, ice cream consumption was 8.08 and 8.56 quarts per capita, respectively. In 1933, with national income down to 42 billion dollars, consumption was 4.72 quarts per capita. By 1941, with income up to around 90 billion dollars, ice cream consumption had risen to 10.84 quarts per capita. This year, a further increase should follow.

Price Indexes Rise As Spot Prices Hold

WITH Federal controls beginning to take definite effect, spot prices of most foods, except meats and dairy products, declined or held steady in the month from mid-March to mid-April. In contrast, most price indexes rose during the period. For example, the Irving Fisher index of wholesale commodity prices rose from 103.6 on March 13 to 105.4 on April 10, while the Fisher index for foodstuffs prices was practically steady at 110.0. In the period from March 14 to April 11, the *N. Y. Journal of Commerce*'s index of commodity prices rose from 101.1 to 102.5, while the same publication's index for foods rose from 99.5 to 103.1, and its grain price index fell from 94.6 to 91.5.

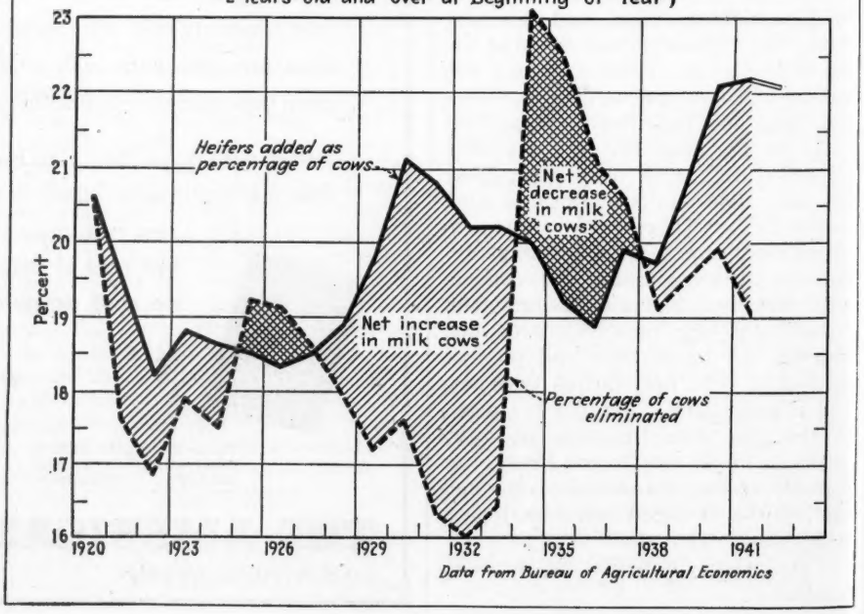
Among spot prices for foods, the price of wheat, No. 2 hard winter, Kansas City, at $1.20¾ on March 14, fell to $1.12 on April 14. Flour also fell in the period, from $6.45 to $6.15. Corn, No. 3 yellow, Chicago, dropped from 82¼¢ to 80½¢ in the month. Meats all rose for the month, beef going from 19¢ to 21¢, lamb from 17½¢ to 18¢ and pork loins from 25¢ to 28½¢. Lard was steady at $12.60, under government control. Eggs upped slightly, from 29¼¢ to 29½¢, while butter zoomed from 34¾¢ to 37¾¢. Cheese also increased from 25¼¢ to 27½¢. Imported food stuffs, including sugar, coffee and

CONSTRUCTION NEWS

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1942 (thousands)
Bakery	.....	.....	$50
Beverages	.....	.....	927
Canning and Preserving	$540	$110	193
Cold Storage Plants	40	.....	215
Confectionery	.....	.....	.....
Grain Mill Products	540	75	180
Ice Manufactured	.....	.....	140
Meats and Meat-Products	.....	.....	143
Milk Products	689	80	947
Miscellaneous	360	110	1,901
	$2,169	$375	$4,696

HEIFERS ADDED TO AND COWS ELIMINATED FROM MILKING HERDS DURING EACH YEAR, UNITED STATES 1920-41

(Shown as Percentages of Number of Milk Cows and Heifers 2 Years Old and Over at Beginning of Year)



Data from Bureau of Agricultural Economics

cocoa, were steady under OPA ceilings. Canned tomatoes were off slightly, from $1.10 to $1.05, while canned peaches, in contrast, rose from $1.87½ to $1.90. Canned salmon was not available on commodity markets during the month.

Food Prospects Up On 1942 Plantings

PROSPECTIVE acreage devoted to principle food crops in 1942 indicates that, with normal yields, food output this year will reach record levels. Corn acreage, at 91,348,000 acres, will be 104.8 percent of 1941 acreage. Oats acreage will be up to 102.6 percent of 1941, while barley will show an increase to 120.7 percent.

Need for increase in domestic vegetable oil output has raised prospective 1942 plantings of soybeans to 14,085,000 acres, 140.9 percent of 1941 acreage, while peanut acreage will increase even more to 166.1 percent over 1941 or a total of 4,150,000 acres. Flaxseed acreage also will increase, to 119.9 percent of 1941 plantings.

Only small increases are in prospect for potatoes, with 1942 acreage of white potatoes at 100.7 percent of 1941; and of sweet potatoes at 102.2 percent of 1941. A small increase is also expected in dry bean plantings, up 104.7 percent over last year.

INDICATORS

Confectionery and competitive chocolate product sales in February, 1942, totaled $28,624,000 for the 190 firms reporting to the U. S. Department of Commerce. These sales were 26 percent over the February, 1941, figures.

Flour production in March, 1942, by mills accounting for 65 percent of United States production, was reported by *"The Northwestern Miller"* at 5,543,160 bbl., compared to 5,801,968 bbl. in March, 1941.

Grain storage capacity in the United States is rated at 1,602,258,000 bu., according to a survey made by the U. S. Department of Agriculture as of March 1, 1942. This compares to a capacity of 1,534,568,000 bu. reported a year earlier.

Salmon canned in 1941 by the United States and Canada on the Pacific Coast of North America totaled 10,080,000 standard cases, an increase of 43 percent over the 1940 pack. The U. S. pack was 7,831,629 cases, compared to 5,605,000 cases in 1940.

Fishery products in cold storage on March 15, 1942, totaled 62,005,000 lb., 24 percent above the figure of one year before.

Hog prices at Chicago touched a 15-year high in mid-April, the top price being $14.50 per hundred pounds.

Meat production in March, 1942, was the largest on record for the month, according to American Meat Institute.

Pumpkin and squash canned in 1941 totaled 2,494,365 cases, all sizes, according to National Canners Association reports. This pack is 1940 totaled 2,299,477 cases.

Carrots canned in 1941 totaled 1,854,734 cases, all sizes, compared to 1,303,990 cases packed in 1940, as reported by National Canners Association.

Tomato pulp canned in 1941 totaled 2,755,415 cases, all sizes, compared to 2,162,405 cases packed in 1940, according to National Canners Association.

Sweet potatoes canned in 1941 reached a total of 1,635,093 cases, all sizes, about 50 percent increase over the 1940 pack.

Spinach pack in 1941 totaled 4,150,166 cases, all sizes, slightly below the 4,206,130 cases packed in 1940.

Green and wax beans for processing are expected to be planted on 105,500 acres this year, compared to 88,000 acres actually planted in 1941.

Sweet corn acreage for processing in 1942 is now estimated at 508,680 acres, up from 454,520 acres planted last year.

Egg production per hen in the United States rose from an average of 84 per year in 1909 to 110 per year in 1941, according to the U. S. Department of Agriculture.

Milk production in February, 1942, with 3 percent more milk cows on farms than a year before, was 4 percent above February, 1941, production.

Milk production per cow on March 1, 1942, was the highest ever recorded for the date.

Milk sales, fluid, in March, 1942, were 4.83 percent above sales in March, 1941, according to Milk Industry Foundation.

Butter, creamery, produced in February, 1942, was estimated at 118,780,000 lb., 8.7 percent below the record February butter output of last year, but 3.7 percent above the 1931-1940 average February production.

Cheese, American, produced in February, 1942, was estimated at 58,055,000 lb., a record for the month, and 45.4 percent above February, 1941, output.

Evaporated milk production in February, 1942, was reported at 296,877,000 lb., 77 percent over output in February, 1941, and 117 percent above the February 1926-1940 average.

Oleomargarine sales in February, 1942, as indicated by sales of internal revenue stamps, amounted to 32,279,656 lb., 7.05 percent over sales in February last year.

Dried whole egg production in February, 1942, totaled 13,342,864 lb., compared to 79,460 lb. a year before, an increase of 16,692 percent.

Dried egg production in 1941, including whole eggs, whites and yolks, grew from 72,800 lb. in January to 8,268,744 lb. in December, with a total for the year of 45,279,486 lb. Of this, 31,241,461 lb. was whole eggs.

Fruits, frozen, in storage April 1, 1942, totaled 120,076,000 lb., compared to 99,405,000 lb. on April 1, 1941, and to a 1937-1941 average for April 1 of 86,101,000 pounds.

Vegetables, frozen, in storage April 1, 1942, totaled 61,677,000 lb., compared to 55,529,000 lb. a year earlier.

Butter, creamery, in storage April 1, 1942, totaled 44,927,000 lb., compared to 8,983,000 lb. on April 1, 1941, and to 23,683,000 lb. average for April 1 in 1937-1941.

Cheese, all kinds, in storage on April 1, 1942, amounted to 188,280,000 lb., compared to 109,893,000 lb. a year earlier and to an April 1 average in 1937-1941 of 85,842,000 pounds.

Eggs, case equivalent, in storage April 1, 1942, were 4,697,000 cases, compared to 2,781,000 cases on April 1, 1941, and to an April 1 average of 2,847,000 cases in 1937-1941.

Poultry, frozen, all kinds, in storage on April 1 of this year amounted to 139,522,000 lb. The quantity one year before was 126,904,000 lb. and the April 1 average in 1937-1941 was 106,496,000 pounds.

Meats, all kinds, in cure and frozen storage on April 1, 1942, was 863,026,000 lb., compared to 963,093,000 lb. on April 1, 1941, and to an average for April 1 in 1937-1941 of 822,538,000 pounds.

Lard in storage, April 1, 1942, was 177,784,000 lb. and rendered pork fat on the same date totaled 4,849,000 lb. On April 1, 1941, the combined figures for these two products totaled 318,685,000 lb. and the average for April 1 in 1937-1941 was 211,051,000 pounds.

Business activity index of *Business Week* stood at 179.7 on April 11, 1942, compared to 175.9 a month earlier and to 144.6 on the corresponding 1941 date.

Weekly wholesale food price index of Dun & Bradstreet, Inc., rose to $3.65 on April 14th, the highest figure since June 17, 1926 and comparing to a figure of $2.77 for the corresponding 1941 date.

Know What's UNDER the Trade-mark Before You Buy MOTORS!

PROUD as we are of the Fairbanks-Morse trade-mark, we urge that before buying you look beyond the trade-mark—*look at the motor.* For we know, and you know, that it's the motor and not the trade-mark that runs machines.

And because we believe you know motor quality when you see it, we ask you to look at the construction of an F-M Motor point by point. Compare the exclusive F-M Copperspun Rotor, for instance, with the rotor in any other squirrel cage motor. You'll say, we're sure, that you want windings centrifugally cast of COPPER, rather than of some less suitable metal.

Would you like to look further into the construction advantages that give F-M Motors their proved stamina? A post card or telephone call will bring you a demonstration. Fairbanks, Morse & Co., Dept. E209, 600 S. Michigan Ave., Chicago. Branches and service stations throughout the United States and Canada.

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FAIRBANKS·MORSE MOTORS

DIESEL ENGINES ELECTRICAL MACHINERY MAGNETOS RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
PUMPS MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

MEN · JOBS · COMPANIES

INDUSTRY

American Creameries & Cold Storage Co. will build two plants near Dallas, Tex., to manufacture cheese and condensed milk products. Cold storage lockers will be installed in each plant.

American Dairy Association of Nebraska has been incorporated with headquarters at Lincoln, to represent all branches of the state dairy industry, including creameries.

Bozeman Canning Co., Mt. Vernon, Wash., plans to operate its newly constructed quick freezing plant at San Jose, Calif., this season.

Califruit Co., San Jose, Calif., will pack tomatoes at its recently acquired plant in Manteca, Calif.

Cranberry Growers, Inc., Hanson, Mass., is constructing a $500,000 cranberry canning factory with a freezing unit, at Markham, Wash., to have a capacity of 250,000 cases a year.

Dixie Frosted Foods is the new name of Southern Frosted Foods, Inc., owned and operated by Ray Hosiery. The plant will pack lima beans, sliced peaches and strawberries.

Peter Fox Brewing Co., Chicago, Ill., has acquired the Kiley Brewing Co. plant at Marion, Ind., to increase the company's annual brewing capacity to more than 1,000,000 bbl. The Marion, Ind., business will be known as the Fox De Luxe Brewing Co., Inc., of Indiana.

Franklin County Sugar Co., Preston, Idaho, has purchased Southeastern Sugar Co., Mt. Clemens, Mich., owned by James E. Davidson.

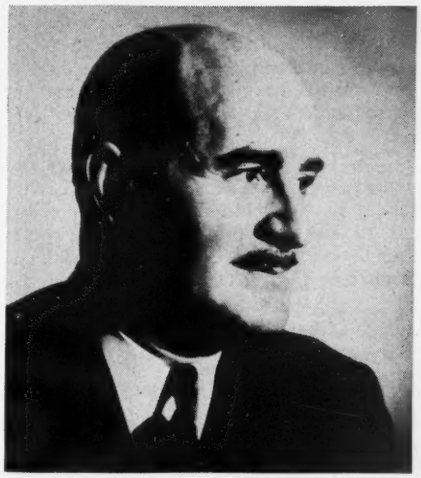
Hathaway Bakeries, Inc., Cambridge, Mass., has purchased the plant and business of Jersey Bread Co., Paterson, N. J.

H. J. Heinz Co., Pittsburgh, plans to build a warehouse and distributing center at Berkeley, Calif., at a cost of $100,000.

Lakeshire Marty Cheese Co. has leased the cheese storage facilities of Monroe (Wis.) Cold Storage, Inc., with a capacity of 6,000,000 lbs.

Libby, McNeill & Libby of Canada, Ltd., will build a $50,000 addition to its plant in Chatham, Ont.

Quaker Oats Co., Chicago, Ill., has purchased the plant and business of Chappel Bros., Inc., Rockford, Ill., manufacturers of dog food. Frank R. Warton of Chappel Bros. will continue in charge and will operate the business as a division of Quaker Oats Co.



WILLIAM B. FORSYTHE

Pepsi-Cola Co., New York, has announced that W. B. Forsythe, managing director of English and export operations, has been elected vice-president in charge of exports. He was formerly general manager of Consolidated Beverages of Canada.

F. L. GUNDERSON

Frank L. Gunderson, director of nutrition, Quaker Oats Co., Chicago, Ill., is now executive secretary of the Foods and Nutrition Board, Division of Biology and Agriculture, National Research Council, at Washington, D. C.

Ralston Purina Co. has purchased a 3-story factory building and property in St. Louis from General Electric Co., at a price reputed to be $125,000. Ralston Purina will use the plant for expansion purposes.

Jacob Ruppert Brewery, N. Y., has leased the plant and facilities of Southern Breweries, Inc., Norfolk, Va., which it will operate as a subsidiary company, "Jacob Ruppert-Virginia, Inc." Acquisition of the brewery, with a yearly capacity of 150,000 bbl., will help to meet the demand for Ruppert beer and ale in the South.

Safeway Stores, Inc., has started construction of a brick egg plant at Omaha, Neb. The building will cost about $60,000, plus refrigeration equipment.

Swift & Co. will build a $50,000 addition to its wholesale market in Winston-Salem, N. C.

University of Nebraska has completed a project to perfect a waxy starch to replace cassava starch, principal source of which was the East Indies. The substitute starch is made from Leoti sorghum.

Wahl-Henius Institute, Chicago, Ill., has established a program of industrial fellowships as an aid to its clients in the food and beverage industries. The program, directed by Robert I. Tenny, will hasten the solution of many problems of substitute materials, new processes and plant conversion. Research in various fields has already begun.

PERSONNEL

Henry Aves has been appointed manager of the Maxwell House coffee plant in Houston, Tex., to succeed the late John F. Sloan.

Richard Bean, formerly with Washburn-Crosby Milling Co., Minneapolis, and with the Washington office of OPA, has been appointed chief of the Food Price Section of the New York regional office of OPA.

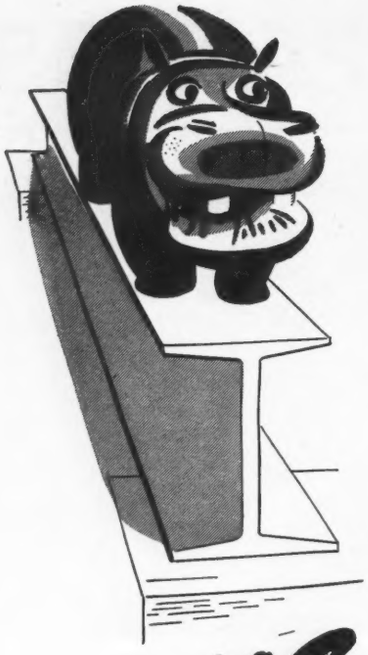
Willard A. Doehnert, formerly with Eastern States Manufacturing Co., has joined the research staff of Central Soya Co., Decatur, Ind.

R. G. Faryon, formerly vice-president of Lord & Thomas of Canada, Ltd., has been named vice-president and general manager of Quaker Oats Co., Canada.

Professor Carl R. Fellers, head of the Department of Horticultural Manufactures, Massachusetts State College, Amherst, Mass., is now a Captain in the Chemical Warfare Service, located at Camp Devens, Mass.

O. Gunn, superintendent of the Dallas, Tex., plant of Swift & Co., has been made superintendent of the Fort Worth plant, replacing W. Louis Armstrong, who is now with the home plant in Chicago.

Joseph O. Hanson has been elected president of Compania Swift Internacional, South American and Australian meat-packing firm, to succeed Harry McLerie, retired.



NO SAG
—IN RIGID,
ONE-PIECE,
WESTINGHOUSE
CS MOTOR
FRAMES!

...JUST
ANOTHER POINT
WHERE THEY'RE
YEARS
AHEAD!

J-21233-A

Westinghouse
Electric and
Manufacturing Co.,
East Pittsburgh, Pa.

Matthew E. Highlands, assistant professor of bacteriology, University of Maine, Orono, Me., who has been on leave of absence to act as plant superintendent for Friend Bros., has become a 1st Lieutenant at the Chicago Quartermaster Depot.

R. P. Juhnichen, sales manager of Washington Packers, Inc., Sumner, Wash., has become consultant to the frozen food section of WPB, having been granted leave of absence by Washington Packers.

R. S. Laird, vice-president in charge of production of Quaker Oats Co. at Cedar Rapids, Ia., has been named general manager of the Cornhusker Ordnance plant near Grand Island, Neb., which will be operated by Quaker Oats Ordnance Co.

B. C. Olney, Snider Packing Corp., has been named consultant to the Food and Apparel Division of OPA.

T. S. Olsen was recently elected vice-president and treasurer of General Baking Co.

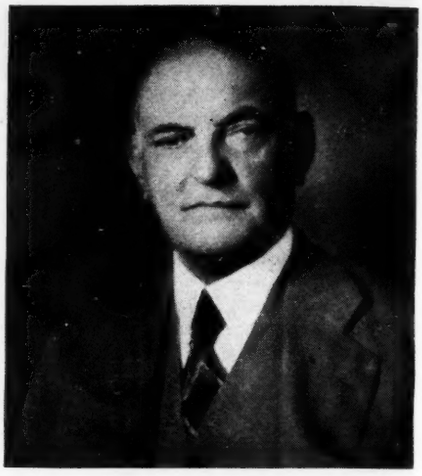
Gertrude S. Smith, Minneapolis, has been named chief nutritionist of the corn refining industry. Miss Smith will translate the government's nutrition program into community projects in the cities in which corn refining plants are located.

JOHN L. BAXTER

John L. Baxter, who has served with WPB and predecessor associations since November, 1940, has resigned as chief of the Canned Foods Section of the Food Supply Branch to return to H. C. Baxter & Brothers. He will continue as consultant to the Canned Foods Section, now headed by E. A. Meyer.

Herman F. Veenker, general superintendent of John Morrell & Co., has been elected a director of the company. He has been with the company since 1911.

William G. Walter, formerly at New York State Agricultural Experiment Station, is now assistant professor in general bacteriology and microbiology of foods and water, Montana State College, Bozeman, Mont.



W. C. HELM

W. C. Helm, vice-president of Russell-Miller Milling Co., Minneapolis, Minn., has been elected president of Millers' National Federation.

R. M. Wellwood has been named executive vice-president and assistant to the president of Sheffield Farms Co., Inc. Mr. Wellwood has been a director of the company and vice-president in charge of country production.

John M. Whittaker, vice-president of Daggett Chocolate Co., Cambridge, Mass., has been named chief of the recently formed confectionery section of the Food Supply branch of WPB.

R. L. Zeigler, of Zeigler Sausage Co., Bessemer and Selma, Ala., has purchased the $500,000 John T. McElroy packing plant and stockyards at East El Paso, Tex.

DEATHS

Lee A. Colton, 64, vice-president of Seneca Kraut and Pickling Co., Geneva, N. Y., and prominent in the National Kraut Packers Association, recently, in Geneva.

John L. Fitzsimmons, 58, president of American Brewery, Inc., April 2, in Baltimore, Md.

Alvin J. Kuehn, general sales manager, Farm Crest Bakeries, Detroit, was killed April 5 in an automobile accident near Detroit.

John A. Martin, 52, assistant director of purchases for WPB, March 22, in Chicago, Ill., when his automobile was struck by a train. Recently he had been stationed in Chicago, devising methods for handling foods purchased by the Quartermaster Corps.

Thomas J. Payne, 64, former president of National Confectioners Association and a leader in the candy industry for more than 30 years, March 31, in Rochester, Minn.

P. O. Peterson, 75, general manager of

Rice Products Corp., Carlisle, Ark., recently, in Little Rock, Ark.

Charles H. Price, 58, founder and chairman of the board of Price Co., April 5, in Miami Beach, Fla.

Albert J. Stetler, joint owner of Charlevoix (Mich.) Pickle and Produce Co., April 3, en route to Detroit.

Walter A. Washburn, 70, retired chemist of the Cliquot Club Co., Millis, Mass., recently, in Malden, Mass. Mr. Washburn was widely known in the carbonated beverage manufacturing field.

Louis A. Zahrn, 64, treasurer of General Foods Corp., and treasurer and director of General Foods, Ltd., and General Foods Sales Co., Inc., April 7, in Scarsdale, N. Y.

ASSOCIATED INDUSTRIES

Allegheny Ludlum Steel Corp. has organized a program to salvage alloy metals from manufacturing operations. As a part of the program the corporation is building a new reclamation plant which will process low-alloy steel to save the alloy content.

Crocker Wheeler Electric Manufacturing Co. announces that Wallace K. Brown has been appointed vice-president in charge of procurement with offices at Ampere, N. J. He has been with the company since 1908.

Dairy Industries Supply Association has added to its membership the Baker Box Co., Worcester, Mass., and Orr and Sembower, Inc., Reading, Pa.

Dodge & Olcott Co., New York, N. Y., has reported the death of Francis Despard Dodge, Ph.D., chief research chemist at the Bayonne, N. J., plant, and a company employee since 1891.

Food Machinery Corp., Peerless Pump Division, Los Angeles, has acquired the Sterling Pump Corp., of Hamilton, Ohio, and Stockton, Calif. The plants will greatly increase productive capacity of the corporation.

B. F. Goodrich Co. has handled a total of more than 34,000 cartons in a special department set up last year to conserve boxboard and paperboard for reuse. Formerly these cartons were classified as scrap and sold as such.

Union Pacific R. R. headquarters, Omaha, Neb., has announced that the Pacific Fruit Express, owned jointly by Union Pacific and Southern Pacific railroads, has been authorized to spend more than $21,000,000 for new and rebuilt refrigerator cars and equipment during 1942. Orders will be placed for 2,000 new cars, featured by convertible bunkers which can be collapsed when bunker ice is not used.

SOLVING *sanitation* PROBLEMS TO HELP YOU PRODUCE MORE!

HOW TO AVOID FOOD SPOILAGE

An effective method to control food-spoiling bacteria, mold and yeast

With stocks of many raw materials limited, the problem of avoiding spoilage becomes increasingly urgent. Maximum output must be obtained from supplies available.

Most common cause of spoilage is from bacteria, mold and yeast that get into the food from contaminated containers and processing equipment or which are present on the raw food product itself. Ordinary cleaning measures which simply remove visible dirt have long been known to be inadequate. Even the use of steam and hot water as applied in most plants fails to achieve the desired objective.

SHORTCOMINGS OF STEAM AND HOT WATER

Authorities on sanitation agree that a temperature of 170°-180° F maintained for two to five minutes is required to kill food spoiling bacteria. Actual tests prove, however, that while the temperature within a steam hose may be over 200° F, it drops below 136° F, just a bare 12 inches from the outlet! Damage to plant and equipment is also a serious drawback. Wide fluctuations in temperature causing expansion and contraction tend to loosen joints, open seams and fittings. Painted walls blister and peel through constant exposure to excessive moisture.

Such handicaps can be avoided and more effective control of food spoiling bacteria, mold and yeast assured through the use of DIVERSOL. More than an ordinary chlorine sterilizer, DIVERSOL offers many outstanding advantages. It is a bactericide with unusual penetrating power . . . power to pierce grease films and fatty matter and make contact with the organisms that cause spoilage.

POWERFUL, QUICK-ACTING, NON-CORROSIVE

Although powerful and quick-acting, Diversol does not corrode or damage equipment . . . guards against undesirable metallic off-tastes and flavors. It is non-poisonous and leaves no after-taste or disinfectant odor. It is the ideal bactericide for the food plant.

Diversol comes in pure white, readily soluble crystals of uniform, fixed strength. Simply add to water and this streamlined bactericide is ready for action . . . just rinse or spray the previously cleaned equipment.

There is no sludge, no muss, no film, no scale. Diversol crystals keep indefinitely, will not freeze . . . and there is no leakage or spillage.

DIVERSEY D-MEN AT YOUR SERVICE

The Diversey D-Man is well qualified to help you solve spoilage and many similar sanitation problems. Furthermore, he is backed up by Research Laboratories that have spent over 18 years developing special purpose cleaners and bactericides.

Just call in a Diversey D-Man on your difficult cleaning and disinfecting problems. No obligation. The Diversey Corporation, 53 W. Jackson Blvd., Chicago, Ill.

Send for Free Bulletin:
"Charting a Course to More Efficient Sterilization"

WIN THE WAR WITH FOOD

GOT A PROBLEM? *Just Call a* DIVERSEY D-MAN

To Canners who are worried about

CONVERSION TO GLASS

SOME people who haven't done glass package retorting before figure they're in for a long spell of headaches. There's no doubt about it, glass package processing can be tricky. But with proper instrument control *there is absolutely nothing to worry about!*

CONTROL IS THE ANSWER

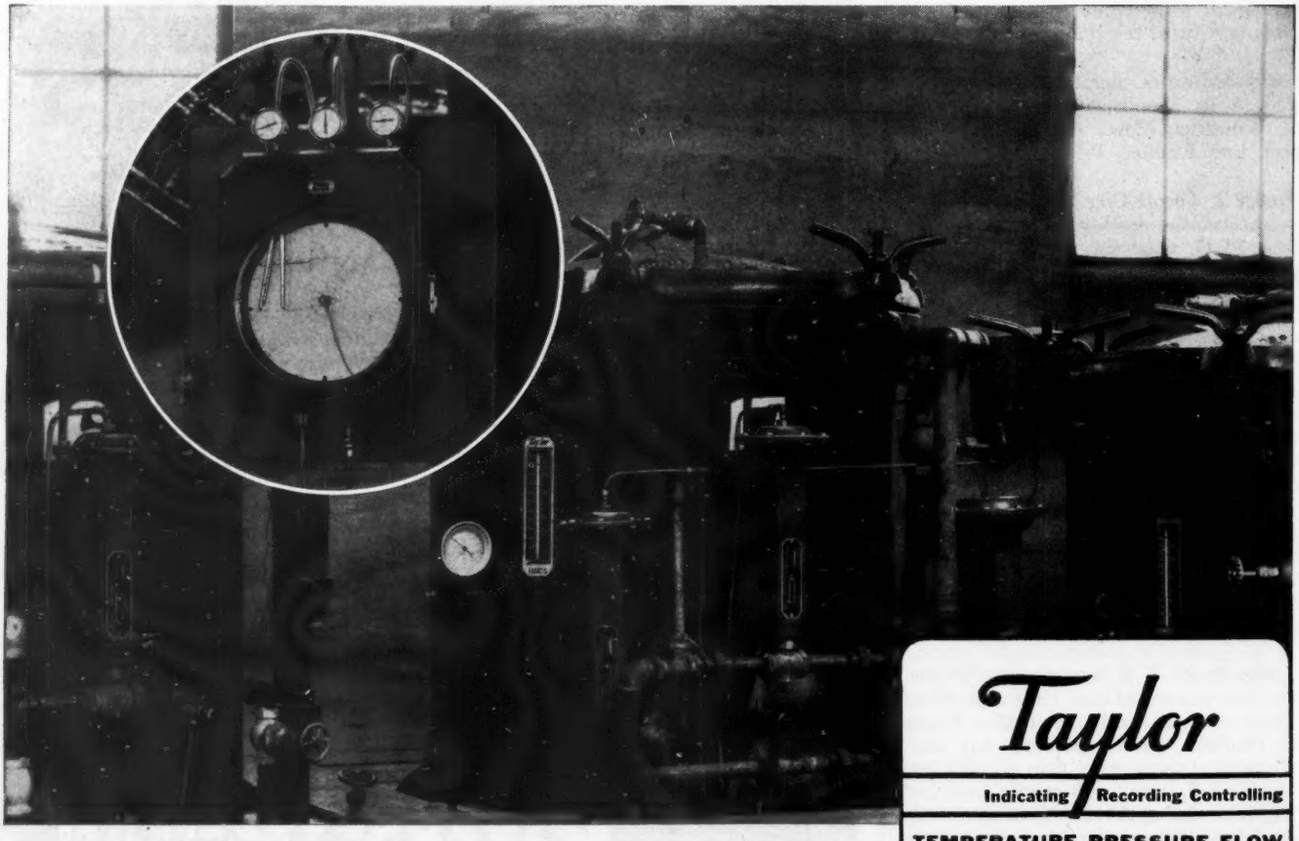
It's true that temperature and pressure limits are narrower than with tin containers. The package research laboratories of the glass container manufacturers usually specify pressure control within plus or minus 1 lb. during holding and cooling, and temperatures within plus or minus 1°F. during holding. It would be difficult, if not downright impossible, to meet these specifications without proper instrumentation. *But that's where Taylor comes in!*

NO NEW PROBLEM FOR TAYLOR

As long as twelve years ago—long before the present emergency arose—Taylor had developed and perfected temperature and pressure control instruments for the processing of glass packages. From the outset, we've worked hand in hand with the container manufacturers. Today, in the Taylor 2-A Retort Control System, we can offer you a tested, proved method of glass package processing control. Once it has been installed, *your worries should be over!*

CALL THE TAYLOR FIELD ENGINEER

Your Taylor Field Engineer knows all about the 2-A System. He has behind him all the engineering research and experience of the entire Taylor organization. He's ready to help solve your problem at the earliest possible moment! Call the nearest Taylor office or write Taylor Instrument Companies, Rochester, N. Y. or Toronto, Canada. Makers of famous "Not 1 but 5" Fulscope Controllers.



Taylor

Indicating Recording Controlling

TEMPERATURE, PRESSURE, FLOW *and* LEVEL INSTRUMENTS

★ KEEP ON BUYING U. S. WAR SAVINGS BONDS AND STAMPS ★

FOOD EQUIPMENT NEWS

V-Belt Drive Mixer

MIXING EQUIPMENT Co., 1045 Garson Ave., Rochester, N. Y., has brought out a V-Belt drive type of "Lightnin" top entering mixer. This enables a V-belt drive mixing unit to be used over open tanks, closed tanks, pressure or vacuum vessels and in both outdoor and indoor installations. With this unit, the speed can be changed merely by changing the sheave and pulley or by means of a variable speed pulley on the motor, which allows approximately 25 percent speed variation. In this way the operator can adjust the speed to correct agitation rates; or if the viscosity is increased due to a change in the material handled, speed can be decreased so as not to overload the motor. The speed range is between 400 and 6500 r.p.m. and hence the drive is suitable only for propeller type impellers and not for turbine type impellers. These units range in size from 1 to 25 hp. and are adapted for mounting in any desired fashion in any size or shape of tank.

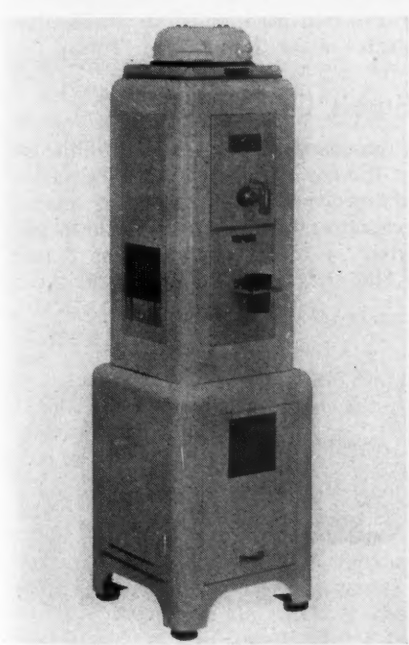
V-belt drive mixer mounted on tanks

Fruit Juice Dispenser

A MACHINE for preparing and delivering refrigerated fruit juice beverages has been developed by Froid Laboratories, 513 Division Ave., South Grand Rapids, Mich., under the name of the "Crystal-Icer". This machine is designed to avoid the dilution of the drink through the addition of cracked ice and also to avoid the necessity for carbonation or for use of chemical preserving agents. In addition to preparing fresh fruit juice drinks, it is also adaptable for using with concentrated fruit syrups.

The model illustrated herewith, Model DF-6, is equipped with a $\frac{1}{6}$ hp. 110 volt, condensing refrigeration unit. Floor space requirement is 18x18 in. and the machine is 52 in. high.

Other models of this machine, with $\frac{1}{3}$-hp. and $\frac{1}{4}$-hp. refrigeration units, and also counter models 37 in. high, are available.



Refrigerated fruit juice dispenser

Dryer for Compressed Air

RUEMELIN MFG. Co., 3860 N. Palmer St., Milwaukee, Wis., is making an air dryer for use with compressed air systems. This system incorporates the use of a water-cooled aftercooler and a centrifugal type expeller. As the compressed air passes through the aftercooler, its temperature is reduced to within 20 deg. of that of the cooling water. After the air leaves the cooler, the centrifugal expeller removes moisture and oil that has been carried over in liquid form. In this way, dry air is delivered to any pneumatically operated equipment in the plant. The condensate from the aftercooler and expeller is discharged by an automatic drain trap.

These systems are available in sizes up to 450 cu.ft. per min. displacement at maximum pressures of 125 lb. per sq.in. The device contains no moving parts.

Rotary Pumps

A COMPLETE new line of direct-connected rotary pumps has been brought out by Blackmer Pump Co., Grand Rapids, Mich. Known as the "D-C" line, these pumps are furnished in standard capacities of 5, 10 and 20 gal. per min. and for pressures up to 100 lb. per sq. in.

They will deliver rated capacity at an operating speed of 1,800 r.p.m. To obtain lower capacity, motor speeds of 1,200 or 900 r.p.m. may be substituted. The standard units consist of pump mounted on a bedplate with flexible couplings for direct connection of an electric motor, steam turbine or gasoline engine. Pumps for belt drive complete with tight and loose pulley and belt shifter are also available in the line.

Track Switch for Conveyors

CLEVELAND TRAMRAIL DIVISION, Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed an electrically-

WORLD LABELERS'

Place in the

VICTORY *Program*

Here, in a nutshell, is the labeler situation:

1. Labeled glass containers are now more important—more useful than ever. The needs of soldier and civilian alike demand peak production of innumerable glass packed products.

   Nevertheless, the skill, experience and production resources that have gone into the building of WORLD Labelers are now being enthusiastically employed for the direct manufacture of war materials and equipment.

2. WORLD Labeler service and repair facilities will be maintained to the utmost limit of our ability in order that your labelers may continue to function with maximum effectiveness however long and hard they may be used.

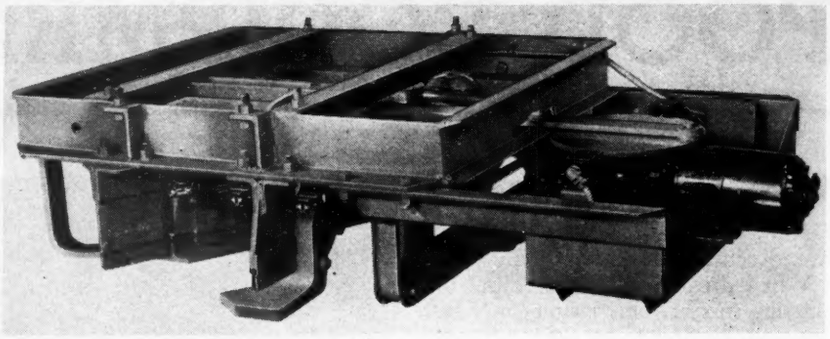
   Do not fail to get in touch with WORLD headquarters for information and assistance on labeler care, maintenance and adaptation to new or changed requirements, as well as for new labelers of vital importance to the Victory Program.

3. WORLD Labeler engineers continue to concentrate on the job of constant development and improvement of automatic labeling in order that it may be confidently stated in the years to come as in the years past that "you get the best labeling in the WORLD."

WORLD LABELERS

ECONOMIC MACHINERY CO.

WORCESTER, MASSACHUSETTS



Electrically-operated track switch for overhead materials handling systems.

operated track switch for use on cab operating, gravity or automatic despatch overhead materials handling systems. Known as "Motor-Driven Type H Switch," this development enables the operator to pre-set the switch at some distance ahead while traveling and thus save time that would be lost if the switching were done by hand. Likewise, indexes on gravity or automatic despatch carriers may be set to actuate trippers and thus cause one or several switches to take desired positions. The new switch is built of welded steel and consists of two main assemblies—an outer supporting frame and an inner sliding frame. The outer frame is designed for bolting rigidly to the superstructure. The inner assembly, carrying a straight and a curved rail, rides on multiple easy operating rollers and is set in position by a motor driven cam through a lever arrangement. The manufacturers state that systems employing motor-driven track switches can be furnished to suit nearly every material handling requirement.

Blackout Materials

To MEET the requirements of protection against air raids, Philip Carey Mfg. Co., Lockland, Cincinnati, Ohio, has brought out various blackout materials.

Among these is a "Blackout Coating" said to be non-reflective and to insure complete light stoppage with one coat. This coating is applied as a paint and is recommended for either inside or outside application, but is particularly suitable for preventing light reflections from the outside surface of skylights.

A more permanent weatherproof exterior blackout treatment for glass surfaces is called the "Carey Laminated System". This consists of the application of a thick film of asphaltic coating in which is embedded an asphalt saturated fabric membrane. This coating is topped with a finish of the asphaltic coating. In use it is said to effect a complete blackout and render glass shatterproof.

Damage to windows from air raids will damage the blackout materials which cover the windows and as a temporary repair, Carey Smooth Roll Roofing or Carey Asphalt-Saturated Building Paper are suggested as temporary expedients.

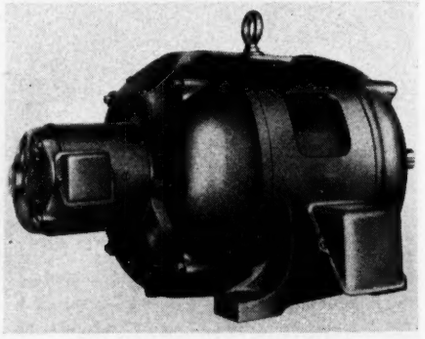
As a means of preventing damage from flying glass, a "Blackout Board" is supplied. This is a building board of laminated asphalt composition suitable for cutting to window size and positioning to the inside of windows. It is sad to have good rigidity, to be moisture and condensate proof, and to be easily installed and quickly removable.

Low Visibility Paint

ARCO Co., Cleveland, Ohio, has brought out a "Low Visibility" paint said to possess good heat deflecting qualities and to serve well as a protective concealment for industrial structures. The paint is said to meet tentative Navy specifications for infra-red reflecting paint for use on storage tanks, buildings and outdoor equipment where dark colors as well as heat reflecting qualities are desired. It is available in green, tan, black and four intermediate shades under the name of "Infray".

Small Generators

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis, Mo., has brought out a line of revolving field alternating current generators. These are available in sizes from 7½ to 75 kva.; 4, 6 or 8 pole; 1,800, 1,200 or 900 r.p.m.; 60 cycles;



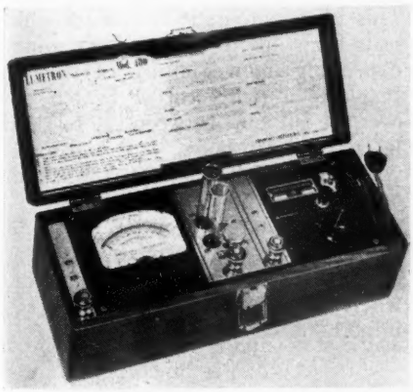
Small electric generator for isolated plants or supplementary power supply.

for belt or coupling drive, or flange mounting. Corresponding speeds are available for other frequencies. The purpose of these generators is for use in continuous service in isolated plants, or for supplementing other available power equipment. They are available in various styles: single phase, two- and three-wire; three-phase, three- and four-wire; or two-phase, four-wire. Also, the neutral may be brought out for three-phase, four-wire systems for light and power.

Portable Colorimeter

PHOTOVOLT CORP., 65 Madison Ave., New York, has announced a new photoelectric colorimeter, called the "Lumetron Model 400." This device features portability, simplicity of operation and low price. It is built into a wooden housing with cover and carrying strap so that it can be used in the laboratory as well as in the plant. It works from any a.c. or d.c., 110-volt outlet and the manufacturer states that it is simple to operate.

Designed to meet the requirements of practical colorimetry, the instrument



Portable colorimeter for laboratory and plant

is always ready for immediate readings. The readings are said to be definite and independent of the judgment of the operator, and no standard solutions are required at any time in routine work.

Refrigerator Air Circulator

FOR USE in cold storage rooms and other refrigerating spaces where trouble is had with moisture condensing on walls and ceilings, Reynolds Electric Co., 2650 W. Congress St., Chicago, has developed the "Reco Refrigerator Circulator." This device is for installation on the ceiling and operates by forcing the air up so that it travels along the ceiling, down the side walls and back to the center again. In this way it takes cold moist air from around the refrigerating coils and mixes it with the room air,

PROTECTION AGAINST PROFIT LEAKS

Many a manufacturer, after adopting Bemis Waterproof Bags, has found the answer to costly, annoying profit leaks. Replacements and allowances for loss of quality and quantity in transit and storage—loss of customers through dissatisfaction—these and many other profit leaks have been overcome by shipping in Bemis Waterproof Bags.

These Bemis shipping containers can be made to keep moisture in and dampness out—retain desirable aromas and repel objectionable odors—shut out dust and dirt—resist acids and grease. And the strength and toughness of Bemis Waterproof Bags provide extra protection against rough handling.

WATERPROOF DEPARTMENT

BEMIS BRO. BAG CO.

ST. LOUIS, MO. • BROOKLYN, N. Y.

STOP THOSE SKIPPERS!

EVERY food plant operator knows what he has to contend with from pests. Take the skipper, for instance. A costly nuisance and a profit stealing pest. Contaminates foods, and if allowed to get out with the product is a source of complaint to say nothing of the loss of goodwill.

Control these pests by thorough fumigation with properly applied HCN gas. Call on your local Pest Control Operator. Talk over your pest problem with him and let him show you his plans for effective control. You will find that a well planned fumigation program carried out by expert and experienced Pest Control Operators may save you future expense and worry that will make it worth many times its original cost.

We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. No obligation, of course.

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INCORPORATED
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CYANEGG
AN ECONOMICAL SOURCE
OF HCN FUMIGATING GAS

equalizing the temperature between the coils and the air around the commodities in storage. This results in increasing the relative humidity of the room and restricts shrinkage of the goods as well as preventing condensation.

The circulator is equipped with a 20-in. propeller. Its minimum height is 15 in. The motor provides three speeds at 1,650, 1,350 and 950 r.p.m. It is furnished for a.c. 110-volt, 60-cycle current, although direct current motors can be furnished if desired. The apparatus will operate from any electric light socket.

Protective Lighting

GOODRICH ELECTRIC CO., 4600 Belle Plaine Ave., Chicago, has brought out the "Elipso Stanlite" for use in protecting illumination around industrial plants. Being of elliptical shape, this lighting fixture is said to provide a wide lateral distribution of light. With proper spacing of fixtures, a brilliant area of light is said to be created around a property line without illuminating the building or grounds. Thus, watchmen remain in darkness and can instantly detect the entrance of any intruder to the area of the brightly lighted fence or plant boundary.

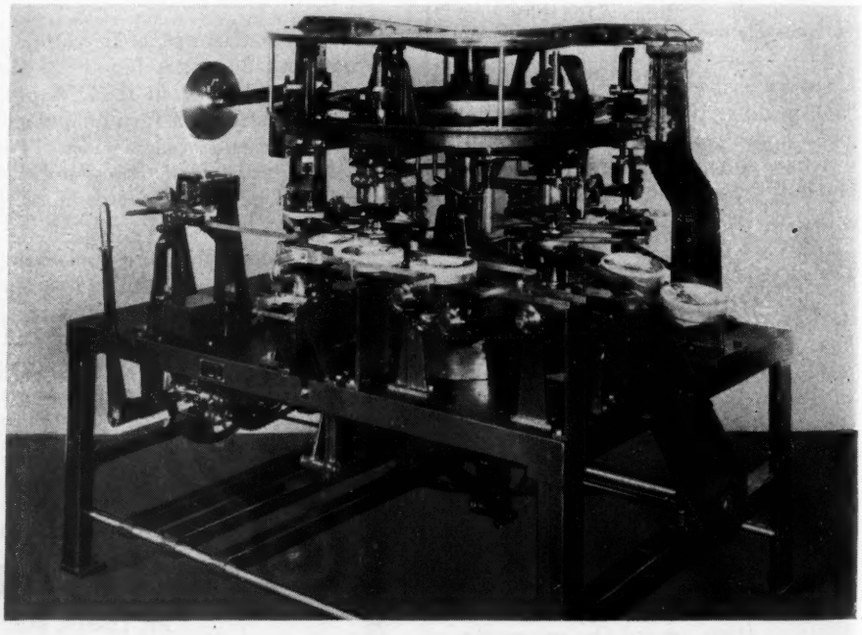
The fixtures are available in two styles—a direct style for delivering light laterally, and an angle style for providing a slight forward throw. Fixtures are porcelain enamel and are designed for mounting on a standard 2-in. pipe.

Blackout Paint

THE MIDLAND PAINT & VARNISH CO., 9110 Reno Ave., Cleveland, Ohio, has brought out Midland P-40 blackout paint for outside application to windows to meet blackout requirements. Inside painting of glass is not recommended as light reflections and halations are still visible from long distances. This blackout paint is said to dry rapidly to a self-leveling dull black surface which does not give reflections or halations. It can be brushed on or thinned with a proper solvent to spray consistency. The makers state that a gallon will on the average cover 550 sq.ft. It is also claimed that this paint is resistant to heat and is unaffected by the sun's rays or by weather conditions. An additional advantage is that the formula is developed so that the product may be easily removed from glass windows simply by wiping off with an inexpensive solvent. This avoids use of special chemicals or expensive scraping after the necessity for blackouts has passed.

Sealer for Telescope Cans

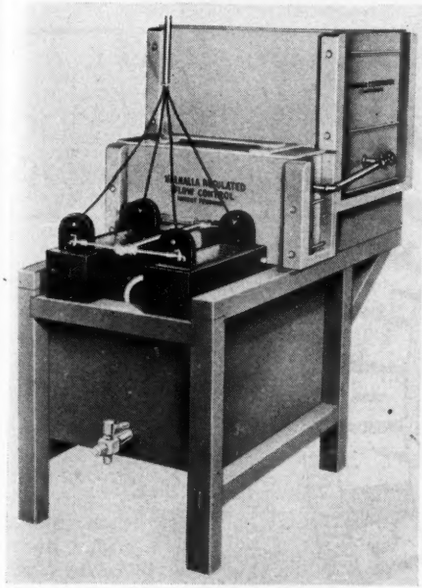
A MACHINE for sealing telescope cans of paper or metal with Scotch tape has been brought out by Minnesota Mining & Manufacturing Co., St. Paul, Minn. This is an automatic can sealer which seals from 40 to 100 cans per minute depending upon the size of the can. It places a tight seal of Scotch tape over the lap joint between the telescope lid and the can body. It is said to prevent moisture loss and to protect the contents of the can from oxygen or other deteriorating agents. The manufacturer states that it is already in use on coffee cans and other types of cans where the maintenance of freshness is important.



Automatic sealer for sealing telescope type cans with Scotch tape.

Chlorine Producer

VALHALLA COMPANY, 231 S. La Salle St., Chicago, has brought out the Valhalla chlorinator, a device for permitting food processors to manufacture their



Device for making chlorine sterilizing solutions.

own supplies of chlorine sterilizing materials.

The device produces sodium hypochlorite, by passing direct current through a common salt solution. It is said to be simple in operation and consists of a tank at the top which is filled with brine. Current is set up in the special cells as the brine flows into them, and the sodium hypochlorite solution in proper concentration for use accumulates in a lower tank from which it can be drawn off as desired.

Laboratory Counters

CLAY-ADAMS CO., 44 E. 23rd St., New York, has brought out a series of laboratory counters for use in counting operations in both laboratory and plant control work. In this series there are one and two unit counters, each unit counting up to 999; and there are six and nine unit counters. These latter two counters are for differential counts and permit counting of five and eight different types of materials or items to be classified, in addition giving a total of all classes of items counted. Both the six and nine unit counters have a bell arrangement which rings at 100, so that percentages are automatically calculated.

Among the suggested uses of these counters in the food industry are in the making of dust counts, particle size counts, colony counts, mold counts, and similar operations.

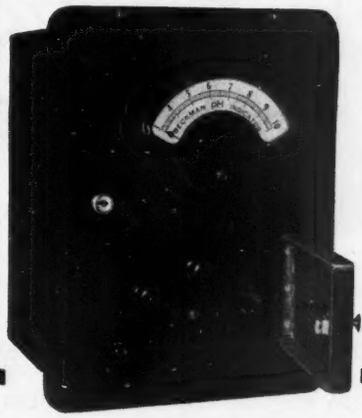
★ ★

CONTROL QUALITY—REDUCE WASTE IN YOUR FOOD PROCESSING OPERATIONS with Beckman pH CONTROL!

Beckman pH Control is rapidly becoming a vital part of many food processing operations—in brewing, in processing milk products, in canning, in jellymaking, in refining sugar . . . in fact, wherever *acidity* or *alkalinity* affects quality, uniformity, color or flavor of the resulting product.

Why not investigate what BECKMAN pH Control can do for YOU in getting the job done better, faster—*for less?* Our experienced research staff will be glad to offer suggestions on what is being done in *your* field with Beckman pH Control.

THE MOST ADVANCED pH INSTRUMENT AVAILABLE TODAY



This Beckman Automatic pH Instrument is finding wide application in controlling—*automatically and continuously*—the pH of many types of large-scale food processing operations. Can be set to *automatically* maintain your processing operations at optimum pH value, insuring more uniform quality . . . higher accuracy in controlling process operations . . . less waste . . . and decreased production costs in *your* plant. This is the most advanced pH instrument available *anywhere* today. Operates directly from 115 v. A.C. current (no batteries) . . . and incorporates all the famous features pioneered and perfected by the Beckman research staff. *Send for Bulletin 16 describing this outstanding instrument!*

WHAT EVERY EXECUTIVE SHOULD KNOW ABOUT pH!

FREE

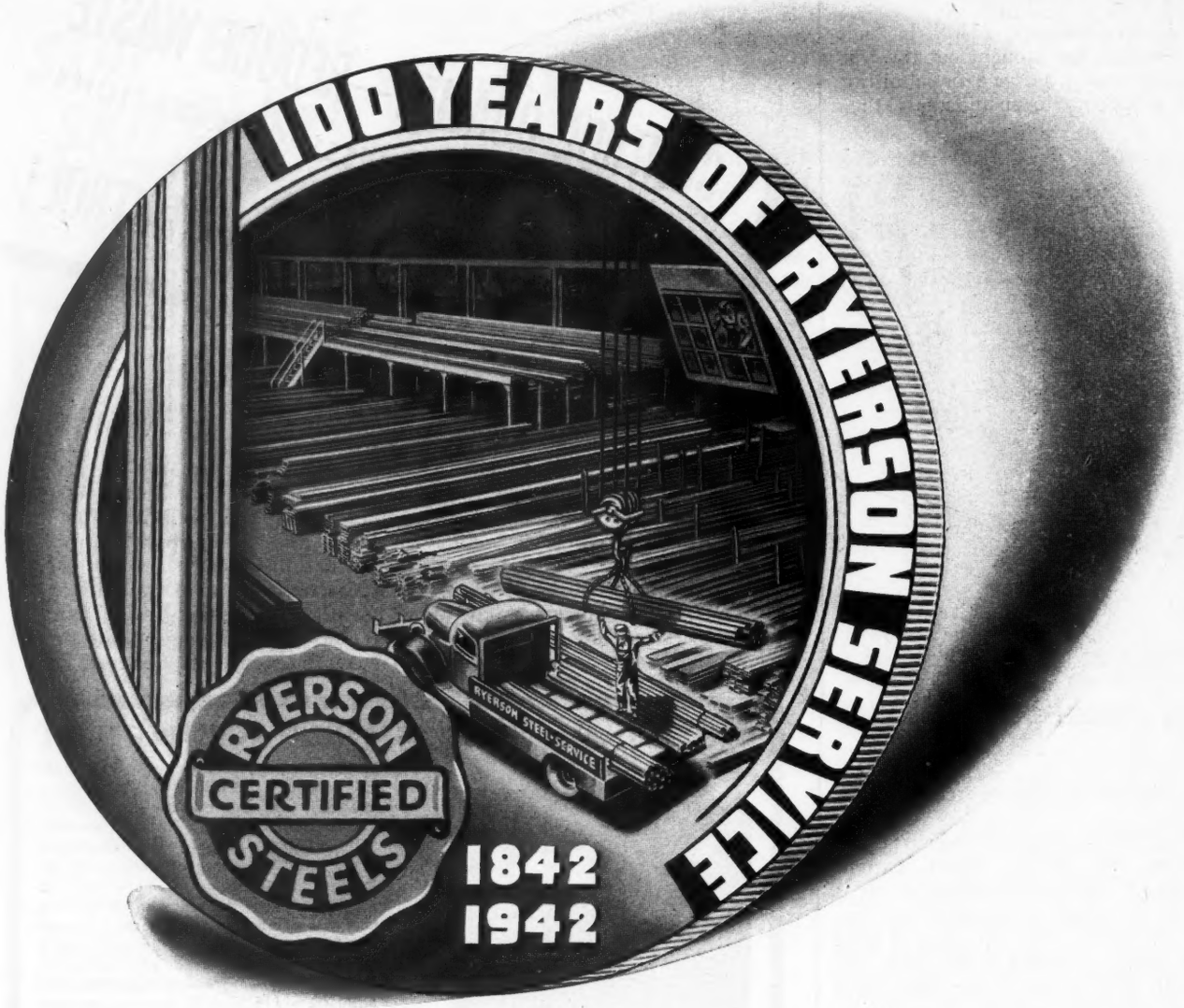
***Every* food executive whether in the plant, laboratory, or front office should send for this informative booklet. Tells what pH is, its importance to modern industrial processing and where it is being used by others to cut costs, reduce waste, increase production. Write today for your free copy!**

THERE'S A BECKMAN pH INSTRUMENT for every application—from portable equipment for plant and field use to *completely automatic* equipment for large-scale process control. Our research staff will be glad to make recommendations to fit your particular requirements. Write, giving detailed information on your processing problem.

NATIONAL TECHNICAL LABORATORIES • SOUTH PASADENA, CALIFORNIA

WORLD'S LARGEST MANUFACTURER OF GLASS ELECTRODE pH EQUIPMENT

Beckman THE LEADING NAME IN pH



A century of service—through peace and war—in good times and bad—Ryerson has served the food industries of America. Ten Ryerson Plants are strategically located for prompt, dependable steel-service. Our steel stocks, which normally contain over 11,000 different kinds, shapes and sizes, have been greatly reduced by the demands of the war. However, our remaining stocks are offered in accordance with the Government Priority Plan. We are always glad to work with you and offer our help in the most effective application and fabrication of all steel products.

Partial List of Ryerson Steels

Bars—Plates
Structurals
Sheets—Strip
Alloy and Tool Steels
Stainless Steel
Tubing
Reinforcing Bars
Welding Rod

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BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Adsorptive Dryers—A complete line of adsorptive dryers for removing moisture from gases, liquids and solids, including operations of drying in the food industries, in ranges from 10 to 100,000 cu.ft. per min., at pressures from atmosphere to 2,500 lb. per sq.in., is described in an eight-page illustrated bulletin issued by C. M. Kemp Manufacturing Co., 405 East Oliver St., Baltimore, Md.

Conveyor Scales—Weighing scales for use on belt conveyors as used in the sugar industry and other similar applications are described in a recent folder, publication ASB100.9, published by Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago.

Disintegrating Equipment—A grinder known as the Bramley mill, said to be particularly adapted to products that require maximum shearing, wiping, wetting and dispersing action, is described in a recent illustrated bulletin published by Bramley Machinery Corporation, 15 Park Row, New York.

Drying Equipment—Rotary dryers, arranged for various types of heating application and used for such operations as drying ground sweet potatoes, starch, salt, distillery waste and grain are described and illustrated with dimensional tables in a recent publication of Hersey Mfg. Co., South Boston, Mass.

Flour Mill Fumigation—A discussion of the complete flour mill machinery piping system for fumigation with liquid HCN, as an effective means of control of insect infestation in flour mills, has been issued as a bulletin of American Cyanamid & Chemical Corporation, 30 Rockefeller Plaza, New York.

Heating for Process Operations—"Dowtherm" heating systems for supplying heat for food processing and other industrial operations are illustrated, described and applications shown by diagrams in a 28-page bulletin No. ID-41-10, issued by Foster Wheeler Corporation, 165 Broadway, New York.

Materials-Handling Equipment—Conveying equipment for the handling of broken or granular dry materials is pictured and described in Bulletin No. 410, a 16-page publication of Chain Belt Co., Milwaukee, Wis.

Rolling Machine—Equipment for rolling jars and bottles and for tumbling containers in various processes of batch grinding or material mixing, is described with specifications in Bulletin No. 56, published by Abbé Engineering Co., 50 Church St., New York.

Porcelain Filters—Micro-porous porcelain filters for research, control and production filtration, in various types, are described in Bulletin No. 912, issued by the Selas Co., Erie Ave. and D St., Philadelphia, Pa.

Processing Equipment—"The Effect of Scrapers on Heating, Cooling and Mixing in Processing Equipment" is the title of a technical discussion issued as Circular No. 71, by Sowers Mfg. Co., 1292 Niagara St., Buffalo, N. Y.

Smoking Equipment—Air conditioned unit smoke houses for the production of smoked meats are described together with detailed drawings and pictures of installations in bulletin 52F-6, published by Carrier Corporation, Syracuse, N. Y.

PLANT SUPPLIES

Bearings—A wide range of sizes in sleeve and flanged bearings, and thrust washers of "Compo" oil retaining porous bronze are discussed in a bulletin issued as Die List No. 18 by Bound Brook Oilless Bearings Co., Bound Brook, N. J.

Condensate Recovery—The high pressure condensate return system known as the Cochrane-Becker is described together with information concerning its application in the draining of kettles, cookers, dryers, and other process equipment in a new 4-page illustrated bulletin No. 3025, published by Cochrane Corp., 19th St. and Allegheny Ave., Philadelphia, Pa.

Power Pumps—Horizontal duplex power pumps, 10 in. stroke, Types KLS, KMS and KPS, are described in bulletin W-411-B31, published by Worthington Pump & Machinery Corporation, Harrison, N. J.

Pump Data—The answers to many everyday questions concerning pumps, piping applications, the viscosity of liquids, pipe friction and many other engineering questions, are given in Bulletin No. 302, issued by the Blackmer Pump Co., Grand Rapids, Mich.

Rotary Switches—Rotary type instrument, control, transfer and auxiliary switches are described, illustrated, and various combinations listed in a new illustrated catalog of 16 pages, Catalog No. 7140, published by Roller-Smith Co., Bethlehem, Pa.

Steam Turbines—Several types of steam turbines including Type S multi-stage steam turbines, available in 15 frames for condensing or non-condensing operations, and Types GA and GB, available with combined reduction gears, are described in Bulletins Nos. 1951 and 1955 issued by Moore Steam Turbine Division, Worthington Pump & Machinery Corp., Wellsville, N. Y.

Vertical Pumps—Practical information concerning the application of vertical pumps for a wide range of industrial pumping installations is given, together with photographs and drawings, in 24-page bulletin No. 29-A107, published by Pomona Pump Co., Pomona, Calif.

CONTROL EQUIPMENT

Control for Sausage Makers—A complete line of control instruments applicable to sausage manufacturing processes, particularly stressing the control of temperature and humidity are described with application information and installation diagrams in Bulletin No. 41-3, issued by the Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

Control Instruments—Analyzers, indicators and recorders for oxygen, CO_2, CO, pH, moisture and other quantities are described in List CEC, issued by Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York.

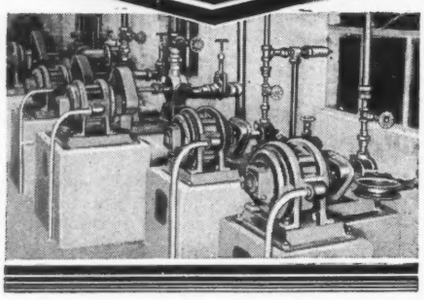
CO_2 Recorder—Recent improvements in CO_2 recording equipment of the "Micromax" type, in which the gas sample comes in contact only with glass, from the time it leaves the stack until it is automatically analyzed, and other improvements, are discussed in Catalog N-91-163, a 16-page illustrated bulletin issued by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.

MISCELLANEOUS

Dairy Plant Cleaning—Bottle washing, can washing and equipment cleaning in the dairy industry with the use of Metso cleansers is discussed in a 15-page illustrated bulletin No. 361, published by Philadelphia Quartz Co., 121 S. 9rd St., Philadelphia, Pa.

Synthetic Rubber—An 8-page catalog section, No. 8000, containing data on the properties and characteristics of Ameripol D synthetic rubber, used in making mechanical rubber products such as gaskets, diaphragms and molded parts, has been issued by B. F. Goodrich Co., Akron, Ohio.

PROTECT
THIS
VITAL POINT



YOUR
PUMP
INSTALLATION

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Pumps are hard to get. It pays, therefore, to safeguard your pumping equipment as never before . . . to prevent possible delay in War production work.

The Viking Service Manual is offered to you FREE to help you get utmost delivery from your Viking Rotary Pumps. It gives you information on correct installation, how to avoid repairs and replacements. Write for your copy today.

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BOOKS

Food Technology Outlined

OUTLINES OF FOOD TECHNOLOGY. By Harry W. von Loesecke. Published by Reinhold Publishing Corp., 330 W. 42d St., New York, N. Y., 1942. 483 pages; 6½x9⅝ in.; cloth. Price $7.

The title of this book accurately describes the contents. The author outlines the more important food processes briefly, and no attempt is made to give detailed descriptions of the preparation of the different food materials. This is about all that can be done in a book of this size, because a complete account of food technology cannot be given between the covers of one volume. However, for those desiring more complete information on any process, the author lists at the end of each chapter a number of references to the literature of food technology.

The fifteen chapters of the book cover: Tin cans and glass containers; fruits and their products; canning of vegetables; dairy products; meat, meat products and poultry; fish and shellfish; grains and their products; edible fats and oils; sugars and starches; nuts; spices, relishes, essential oils and extracts; beverages; confectionery, jams, jellies, preserves and certified dyes; storage and marketing of fruits and vegetables; and preservation of foods by freezing.

The value of a book of this type lies not in the information it gives a specialist on his own field but in the information it gives the specialist, and others, on food processing in general. In that respect it is of value also to food company executives, in both production and sales departments. Newcomers to the food industry will, of course, find this overall picture of food processing most helpful in giving them their "bearings" in the industry.

Bread and Nutrition

MODERN BREAD FROM THE VIEWPOINT OF NUTRITION. By Henry C. Sherman and Constance S. Pearson. Published by the Macmillan Co., 60 Fifth Ave., New York, N. Y., 1942. 118 pages; 5x8¼ in.; cloth. Price, $1.75.

The national nutrition program having directed attention to the nutritional shortcomings of white bread, this book will enable bakers and others interested in the health values of bread to get the proper perspective on the subject of enrichment. The authors discuss the new bread problems growing out of progress in nutrition, give the characteristics of bread as food, outline the protein, mineral and vitamin values of white bread and consider the quantitive place of bread in the diet.

Minerals and Food

MINERALS IN NUTRITION. By Zolton T. Wirtschafter. Published by Reinhold Publishing Corp., 330 W. 42d St., New York, N. Y., 1942. 175 pages; 5½x7½ in.; cloth. Price, $1.75.

For those interested in the nutritional value of minerals in foods, this book gives a concise and clear picture of the subject. The first chapter discusses the minerals in the body and the second one the action ot minerals and their distribution in the various parts of the body. Potassium, calcium, magnesium, phosphorus, sulphur, iron, iodine and other minerals are taken up separately in subsequent chapters, their nutritional functions being outlined and their food sources listed.

Chemical Dictionary

THE CONDENSED CHEMICAL DICTIONARY. Third Edition. Published by Reinhold Publishing Corp., 330 W. 42d St., New York, N. Y. 1942. 756 pages; 6½x9 in.; cloth. Price $12.

Those in the food industries who buy or use chemicals will find this book useful. Not only are the thousands of substances listed defined, but chemical and physical properties are given, along with some practical information such as the containers in which the product is supplied and the uses to which it is put. Substances identified by a trade or brand name are included in the dictionary. Forty-five tables of chemical and physical data are contained in the Appendix of the dictionary.

Storage Data

THE COMMERCIAL STORAGE OF FRUITS, VEGETABLES AND FLORISTS STOCKS. Published by the U. S. Department of Agriculture; 52 pages, 6x9¼ in.; paper. Price 10 cents; for sale by Superintendent of Documents, Washington, D. C.

Here is presented a series of brief summaries of the essential average storage requirements of the more important varieties of fresh fruits and vegetables. These facts should be known by food manufacturers using fruits and vegetables that must be stored until used. Details are omitted from the pamphlet because it is intended to be used only for general practical reference.

PATENTS

Olives Pitted by Mechanical Means—George W. Ashlock, Jr., Oakland, Calif. No. 2,271,675. Feb. 3, 1942.

Bread Protected Against Rope and Mold Growths by Addition to Dough of Nontoxic, Soluble Acetate Salt Containing Undissociated Acetic Acid—Hans F. Bauer and Elmer F. Glabe, to Stein, Hall Manufacturing Co., Chicago, Ill. No. 2,271,756. Feb. 3, 1942.

Baked Bread Loaf, Cake and Like Freed From Baking Pan by Stream of Compressed Air With Force Directed Along Edge of Pan Downwardly Between Pan Wall and Crust of Loaf—Eugene Oscar Engels, to Baker Perkins, Inc., Saginaw, Mich. No. 2,271,937. Feb. 3, 1942.

Flour Bleached by Addition of Free-flowing, Powdered Mixture of Active Organic Peroxide, Alkalinous Metal, Water-soluble Salt With From 2 to 12 Moles of Water Crysallation, and Anhydrous Packing Inhibitor—Frederic H. Penn, Dallas, Tex. No. 2,272,576. Feb. 10, 1942.

Flour Bleached by Addition of Free-Flowing, Powdered Mixture of Active Organic Peroxide, Water-soluble, Alkali Metal Salt With From About 2 to 10 Moles of Water Crystallization, and Anhydrous Packing Inhibitor—Frederic H. Penn, Dallas, Tex. No. 2,272,577. Feb. 10, 1942.

Butter Given Improved Storage and Keeping Qualities by Dehydrating, Hydrogenating in Absence of Air and Moisture at From About 35 to 60 Deg. C. and Emulsifying With Water—Frederic H. Penn, Dallas, Tex. No. 2,272,578. Feb. 10, 1942.

Wheat in Dry State Treated With Steam Under Reduced Pressure to 130–160 Deg. F. to Weaken Enzymes in Outer Surfaces of Berry Without Shortening the Gluten, Attacking the Starch, or Substantially Increasing the Moisture Content Preliminary to Milling—Hermann Graumann, Santpoort, Netherlands, to Wessanen's Koninklijke, Fabrieken, N. V., Wormerveer, Netherlands. No. 2,272,663. Feb. 10, 1942.

Cheese Curd Held at Desired Temperature in Water-jacketed Hopper Having Funnel-shaped Lower Section—Paul Sartori, Plymouth, Wis. No. 2,272,954. Feb. 10, 1942.

Fats and Oils Stabilized by Removal of Photosensitizing Pigments During Percolation Through Column of Finely Powdered Sugar—Mayne R. Coe and Mayne R. Coe, Jr., Washington, D. C., to People of the United States of America. No. 2,272,964. Feb. 10, 1942.

Fibrous Nut Meats With Portion of Oil Removed Added as Stabilizer to Fruit Mixture—Jesse Clayton Forkner and John H. Forkner, Fresno, Calif. No. 2,272,989. Feb. 10, 1942.

Filling for Fig Bar Made to Contain Mixture of Ground Figs, Sugar and Water, and Small Proportion of Stabilizer Consisting of Ground Coconut Meat With Major Portion of Oil Removed—Jesse Clayton Forkner and John H. Forkner, Fresno, Calif. No. 2,272,990. Feb. 10, 1942.

Filbert Nut Meats Treated With 3 Percent Alkali Solution From 1 to 4 Min. Rinsed With Water, and Treated With From 2 to 4 Percent Solution of Acid Preparatory to Removal of Skins by Forceful Water Action—Edward B. Edes, Lebanon, Ore. No. 2,273,183. Feb. 17, 1942.

Sugar Beet Juice Defecated by Treatment With Slake Calcium Oxide Obtained by Calcining Lime Cake in Direct-fired Furnace With Recovery of Carbon Dioxide Subsequently Used for Carbonating Lime-defecated Beet Juice—Robert M. Daniels to Holly Sugar Corp., Colorado Springs, Colo. No. 2,273,253. Feb. 17, 1942.

Beverage Extract Clarified by Passage Through Inverted Cone Filter With Drain Only at Apex and Lining of Filtering Material Covering Interior Surface of Filter Cone and Extending Across Drain Opening—Max H. Schroeder, Rockville Center, N. Y. No. 2,273,422. Feb. 17, 1942.

Chewing Gum Made to Contain Ethyl Cellulose and Gum Eelected From Resins, Rubber and Chicle Group—Waldorf S. Traylor, Newport, Del., to Hercules Powder Co., Wilmington, Del. No. 2,273,425. Feb. 17, 1942.

Pectin Converted From Water-insoluble to Water-soluble Form by Treatment With Organic Acid Solution and Recovery of Portion Containing Water-soluble Pectin—Paul Hirsch, Palermo, Italy, to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,273,521. Feb. 17, 1942.

Pectin Treated With Acid Reagent to Change Setting-time Properties of Pectin Without Appreciably Dissolving Pectin—Glenn Howe Joseph, Corona, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,273,527. Feb. 17, 1942.

Eggs Graded for Weight on Photocell-activated Scale—John E. Powell, Issaquah, Wash., to National Poultry Equipment Co., Seattle, Wash. No. 2,273,591. Feb. 17, 1942.

Biscuit-making Materials Mechanically Filled Into Form-shaping Molds by Distributor and Series of Conveyors Connecting With Feed Hopper—Morris M. Raymer, Augusta, Mich., to Kellogg Co., Battle Creek, Mich. No. 2,273,735. Feb. 17, 1942.

Yeast-cell Extract Prepared by Heating Yeast Mixture and Plasmolyzing Agent to Destroy Fermenting Power Without Substantial Autolysis of Yeast and Passing Through Colloid Mill Preparatory to Adding to Beer to Increase Vitamin Content—Albert M. Fischer, Chicago, Ill., to Rotary Extractor Corp., Long Island City, N. Y. No. 2,273,853. Feb. 24, 1942.

Corn Gluten Containing Not More Than 45 Percent Starch Treated With Acid to pH From 0 to 2 Preparatory to Removal of Starch and Recovery of Protein—Paul R. Shildneck, Decatur, Ill., to Prolamine Products, Inc., Dover, Del. No. 2,274,004. Feb. 24, 1942.

Vanilla Beans Cured by Holding in Frozen State for Several Days and Thawing at Room Temperature Preparatory to Drying and Aging—Arnold K. Balls, Washington, D. C., and Arthur G. Kevorkian and Francisca E. Arana, Mayaguez, P. R., to the People of the United States. No. 2,274,120. Feb. 24, 1942.

Egg Meats Forced Through Closed Filter Circuit by Gas Pressure—Frank B. Lomax, Chicago, Ill. No. 2,274,148. Feb. 24, 1942.

Dough Prepared in Mixer Equipped With Refrigerating Unit to Maintain Positive Control Over Mixing Temperature—Merlin A. Sticelber, Kansas City, Mo. No. 2,274,220. Feb. 24, 1942.

Baked Bread Loaf Kneaded Under Pressure, Sheeted, Tempered to Desired Uniform Motsture Content and Fried in Deep Fat With Formation of Innumerable Spaced Bubbles on Opposite Sides of Resulting Chip—Glen Edson Junge, Fort Scott, Kans. No. 2,274,416. Feb. 24, 1942.

Frozen Confectionery Products Shaped, Frozen and Packaged on Large-volume Production Basis—Norman M. Thomas, Medford Lakes, N. J., to Joe Lowe Corp., New York, N. Y. Nos. 2,274,464 and 2,274,465. Feb. 24, 1942.

Frozen Confections Discharged From Shaping and Freezing Molds Into Plurality of Individual Boxes With Means to Prevent Units in Each Row From Overriding During Packaging Operation—Thelma Evelyn Mary Huth, Los Angeles, Calif., to Joe Lowe Corp., New York, N. Y. No. 2,274,478. Feb. 24, 1942.

Dextrine Prepared From Starch on Continuous-process Basis—Anthony C. Horesi, Downers Grove, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,274,789. March 3, 1942.

Carbohydrate Mash Containing Alkaline Salts Fermented to Glycerin—Nathan M. Mnookin, Kansas City, Mo., to Speas Development Co. No. 2,275,639. March 10, 1942.

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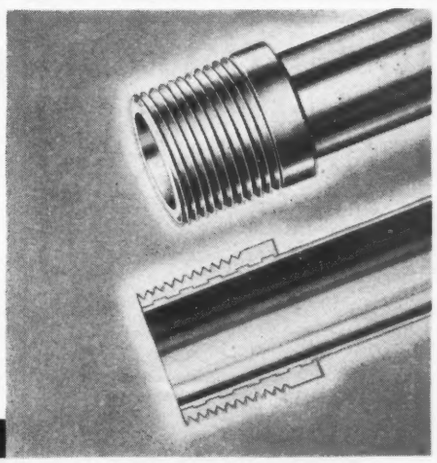

The Wallace Pipe Joint permits use of light gauge tubing where pipe of standard gauge would otherwise be required. Critically needed stainless steel is saved, (about 65%). A special threaded and enlarging ferrule is inseparably joined to a length of stainless tubing through the medium of expansion. No soldering or welding. Average installation time per joint, two minutes.

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The WALLACE PIPE JOINT by TRI-CLOVER

Converting Brewery

(*Continued from page 48*)

hyde and fusel oil. Therefore, the high wine is redistilled in the rectifying still. In breweries the brew kettle serves for the evaporation of the surplus water. A rectifying column attached to the brew kettle can be made by filling available glass-lined tanks with Berl's tower fillers (see Fig. 4), installing a few decks fitted with bubbling caps. This has been found to be an efficient arrangement and would be operated as a pot still. The rectifying column is provided with a dephlegmator and condenser, the same as the beer still. Coolers found in breweries could be converted into Coffey-type dephlegmators and condensers. In the batch still, "heads" are taken off first, containing most of the acetaldehyde, then the middle run of the high-proof (190 deg.) good alcohol, and finally the fusel oil. According to the foregoing description, the beer still would be operated continuously, while rectification would be a batch operation.

Fig. 3 shows a wooden beer still which is operated under 3 to 5 lb. of pressure. Every part of the still is made of wood, with the exception of the bubbling caps and the down-take pipes which should be of copper or cast iron. The metal requirement for the caps and down-take pipe is small in contrast with the amount of metal saved by the use of a wooden beer still. The slop discharge chamber, where the live steam also enters for distillation purposes, could be a section from an enameled tank provided with a top and a bottom cover as shown in the drawing.

Fig. 4. Berl's tower fillers for packing the rectifying column. They are made of ceramic materials.

The slop coming from the beer still contains suspended and dissolved matter, which, after screening, is divided into thick and thin slop. The thick slop represents the suspended matter, which in physical appearance is somewhat finer than brewer's grain and can be sold for feed without further processing. For the recovery of values from the thin slop, expensive multiple evaporators and dryers would be required. Therefore, thin slop should be disposed of, as many distillers are still doing, by running it into sewers or rivers. Some communities restrict the disposal of this slop through sewer lines or rivers. *Special waste disposal provision must therefore be made beforehand.*

In breweries the fermenting rooms are usually low in height. During the production of 6,000 gal. of 190-proof alcohol per day, there is given off 6.6 lb. of CO_2 per gallon of absolute alcohol, or 37,600 lb., of which 75 percent is collectible. A brewery of the same mashing capacity produces approximately 14,500 lb. of CO_2, and usually 8,000 lb. is collectible. Therefore, good ventilation must be provided. The recovery of CO_2 may also be advantageous if suitable compressors and refrigerators are available in the brewery. All of the accessories in the way of steam and power plant, water supply and shipping facilities are at hand in breweries. Only the stills, as previously mentioned, would be required to convert a brewery to industrial alcohol production. Because the buildings are substantially constructed, the stills could be erected in them quite easily.

With the exception of distillation, all steps in brewing and manufacturing industrial alcohol are well understood by the management and personnel. As alcohol is shipped in tank cars, office and shipping labor is small. Large breweries could reconstruct their plants, so that part of the year they could produce beer 24 hours per day, and during the remainder of the year they could operate on industrial alcohol.

Table I shows the material requirements for a distillery producing 6,000 gal. of industrial alcohol daily. A perusal of this table shows the potential possibilities of utilizing breweries for the production of industrial alcohol. Another advantage of such a plant conversion would be that after the war, when the demand for industrial alcohol subsides, the converted breweries could return to the manufacture of beer.

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Dehydrating Vegetables

(*Continued from page 45*)

quality of the sample.

On the basis of these tests the samples may be given a numerical rating according to some such scoring plan as the following:

Drained weight	20
Color	10
Texture	30
Flavor	30
Odor	10
Total	100

Negative points, that is, deductions, may be assessed for off-odors or other very objectionable defects; or the sample may be disqualified in such cases.

Vitamin Assays—Determination of the various important vitamins of vegetables—namely, A, various components of the B group, and C—requires special apparatus and methods that are beyond the capabilities of the average factory control laboratory. There is a great need for research to determine the effect of dehydration on the vitamin content of various vegetables, particularly A and the B group. It is believed that there is fair retention of these vitamins in the dehydrated vegetables blanched before drying. This laboratory has conducted considerable research on this problem and has under way additional work on it.

Producers who may wish assays made should secure the advice of vitamin

specialists such as those of the home economics department of the University of California.

References

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38. E. M. Mrak, Some Factors in the Production of Dried Fruits, *Fruit Products Journal*, vol, 20, 267–283, 293, 1941.
39. E. M. Mrak, Retention of Vitamins by Dried Fruits and Vegetables, *Fruit Products Journal*, vol. 21, 13–15, 1941.
40. F. E. Price and Ivan Branton, Corn Drying, Oregon Agricultural Experiment Station Bulletin 352, 1–30, 1937.

Near 'Ems Don't Count

(*Continued from page 40*)

tests. The results were decidedly promising.

The starch obtained in this manner was tasteless. In a way, it was the essence of nothingness. It simply had no taste. Certainly there was not a trace of the raw, uncooked starch flavor about it. While it was not a powder and could not be ground to a powder, this made little difference anyway, for the puffed mass disintegrated in water very quickly to form a thin, fluid gel.

The writer tried to find someone making puffed starched in commercial quantities, getting in touch with the one obvious possible source and a few others, but had no success. Evidently, while Anderson's original work had covered starches, the commercial application of his patents to the puffing of cereals such as wheat and rice had blotted out the other work. Consequently, for lack of a source of supply, the experiment was dropped.

In the mixing of many cake batters it is customary to whip the egg whites, when they are used, separately and then fold them into the rest of the batter. In this way the beaten whites contribute substantially to the structure of the finished cake, bringing to the batter thousands of small air cells. The egg white foam, naturally, is a somewhat fragile thing, and in the process of blending it and the main batter, much of the lightness of this whip can be lost.

It seemed probable that some means could be found of so stabilizing these whipped egg whites that even under quite rough handling they would not break down. The idea of adding some finely divided solid substance to the foam, a substance that would collect at the interface, in line with usual theory on the subject of foams, came to mind. Flour, of course, had been used occasionally by bakers before. It is not very satisfactory because the flour itself takes up moisture when in contact with the whites. What was wanted, according to theory, was a powder which did not take up any water and was, in so far as possible, insoluble. Talcum powder was tried and gave excellent results. Using very small percentages of talcum powder, egg white foams could be stabilized for long periods of time and "toughened" to resist much handling. Still, talcum powder is not exactly a food product and therefore, while a gratifying vindication of the basic idea, it hardly advanced the experiment.

Casting about for something to take the place of talc, yet be edible, the idea of using cocoa seemed feasible. There was, of course, the drawback of the fat content of the cocoa, but this was easily remedied by preparing a special fat-free cocoa for the experiment. Using fat-free cocoa, results strikingly similar to those obtained with talc were obtained. The egg white was stable and highly resistant to handling. The results were favorable in the cake.

Naturally, the use of even fat-free cocoa restricted the idea to chocolate batters. No correspondingly good stabilizing agent was found that was white enough for use in other batters. Consequently, the experiment fell short of being an all-out success.

There they are—experiments that lie among the laboratory files and gather dust. There are many others to keep them company—the Great Pie Crust Research for one, and the Continuous Batter Mixing Problem for another. Nor can it safely be assumed that all of them are dead, even though buried.

Footnote to Success

P.S.—The writer's wife said it should be mentioned that he has an excellent job, and the foregoing experiments are only the exceptions to his general rule.

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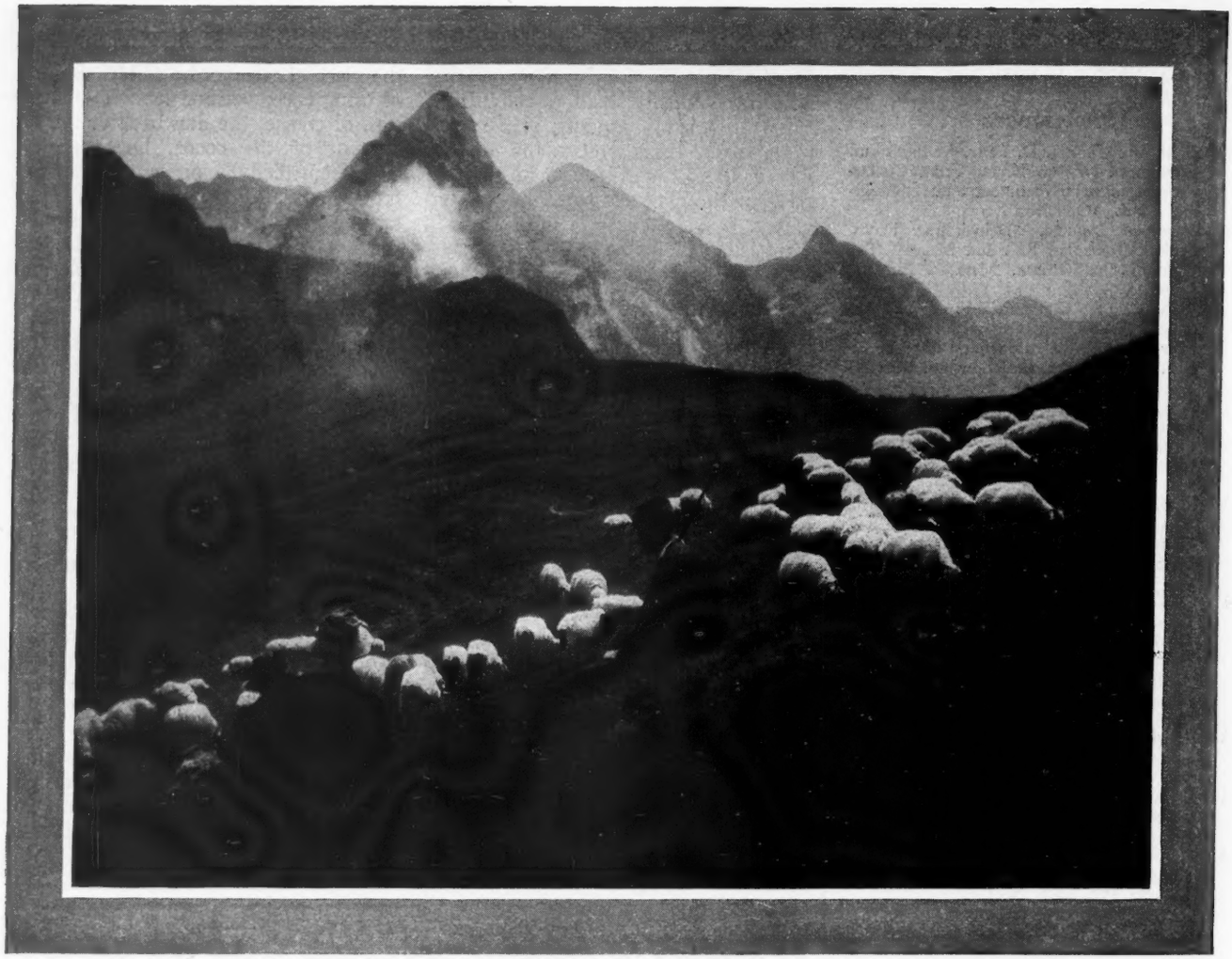

CONTRAST IN NUTRITION

Feeding 200,000,000 people engaged in total war presents a mighty problem. They cannot be herded on some choice mountain pasture and left to feed off nature's table. Food must be transported to them, at home and in distant lands, over facilities sorely taxed by rubber shortages, ship sinkings, and movements of military forces and equipment. To do this and at the same time safeguard against the vitamin deficiencies encountered even before the war, each cubic foot of space must carry new high vitamin values. The quickest, most direct and cheapest way to accomplish this is through addition of pure vitamin substances like thiamine (vitamin B_1), niacin and ascorbic acid (vitamin C). A single ounce of thiamine, for instance, represents the full daily vitamin B_1 requirement of 15,750 active adults! Our company manufactures synthetic vitamins actually by the tons and stands ready to help your own research department solve the nutritional problems looming ahead on the horizon.

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

ENGINEERING

Vacuum Smoking

U. S. PATENT No. 2,266,131 (granted Christian Thon, Oslo, Norway, on December 16, 1941; in Germany, October 6, 1937), relates to a process for smoking food products by replacing the air contained in the cells or pores of the food products with smoke. This is accomplished by placing the product to be smoked in a smoking chamber, evacuating the air and introducing smoke into the chamber. The smoke gases are introduced into the smoking chamber at a pressure which is approximately the same as the pressure in the smoking chamber at any moment. If the smoking chamber is evacuated first and the smoke is introduced by the pressure of one or more atmospheres, a sudden expansion of the smoke gases takes place, accompanied by condensation of some of the gases. The condensation products are then deposited on the food being smoked and give it an undesirable appearance and taste.

When smoking is done according to the method prescribed in the patent, expansion and condensation of the gases are avoided and an even and thorough penetration of the smoke in the product is obtained. The smoking is usually completed when the pressure in the smoking chamber has reached the atmospheric pressure.

The smoking process, according to the invention, results in a quicker smoking through of the products. A comparatively great smoking capacity will be obtained, even with a comparatively small apparatus.

Freezing Food Products

FREEZING flowable food products, such as liquids or semiliquids, in wrapped or packaged form, by rapid or quick freezing methods, is described in U. S. Patent 2,260,450 (granted to Joseph E. Guinane, White Plains, N. Y., on October 28, 1941). It has been proposed to employ relatively thin, flexible, moistureproof packaging or wrapping materials, such as transparent cellulose.

One of the objects of this method is to make possible the filling, closing and sealing of flexible packages in such a manner as substantially to eliminate air from the packages while leaving room for expansion of the content during freezing. In order to obtain quick freezing, the package is made into a wide, flat, thin shape and contact is made on two sides with the horizontal refrigerated element. Expansion is controlled during the freezing process in order to form uniform rectangular blocks of the desirable size.

BAKING

Butter Emulsion in Baking

IN MAKING melted butter, which requires less refrigeration in storage than butter, an emulsion is formed as a by-product. This emulsion may contain 55 to 70 percent water, 25 to 40 percent fat and about 5 percent non-fat solids (largely protein). Trials with bread and cake doughs gave excellent baking results with quantities of emulsion yielding 5, 10 and 20 parts butterfat to every 100 parts flour. Trials as a pan-greasing medium, to prevent sticking of baked goods, were less successful. Emulsions with high fat content prevent sticking, but leave the pans streaked with pyrolysis products of lactose and protein. This necessitates frequent scouring. The emulsion is a useful ingredient in margarine and is definitely an improvement in several varieties of cheese. It should be added to the curd, not to the fresh milk, since the emulsion interferes with curd formation.

Digest from "Potential Uses of Emulsion from Melted Butter Production in Baking," by A. Schloemer, *Zeitschridt fur Untersuchung der Lebensmittel*, Vol. 81, 309, 1941 (Published in Germany).

CANNING

Effect of Canning On Food Value

AS COMPARED with home cooking, canning generally conserves vitamin C better but probably home cooking has the advantage in conserving vitamin B_1. In general, canned foods may be rated equal to home cooking. Losses of mineral salts and carbohydrates are about the same in either case. For the effects on proteins, no exact comparison can be made from existing data, but it is known that blanching causes spinach to lose about 10 percent of the initial protein content. Canning has an advantage in obtaining field-fresh vegetables. The canned product may be superior for this reason alone, in the case of vegetables which deteriorate rapidly, since home-cooked vegetables are generally from markets and may be several days old when cooked. Since vitamin B_2 is more stable to heat than vitamin B_1, its losses occur mainly from leaching. In the case of vitamin C, an efficient heat exhaust, with minimum headspace left in the closed can, is important for prevention of loss by oxidation. Leaching is the other principal cause of losing vitamin C. Retaining the liquid in which the vegetable is cooked is therefore an important conservation measure whether in canning or in home cooking.

Digest from "Nation's Food. III. Effect of Canning On Nutritive Value of Canned Vegetables," by W. B. Adam, *Chemistry and Industry*, Vol. 60, 427, 1941 (Published in England).

CEREALS

Gluten and Flour Aging

THE PHYSICAL PROPERTIES of gluten, as indicated by its hydration capacity in acid solution, are impaired by the aging of flour. Some of the effects of aging in flour can be overcome by extracting with ether, but the extraction does not restore gluten to its original quality. Gluten from aged deteriorated flour swells enormously in dilute aqueous acetic acid, not because its quality is good but because its resistance to dispersion is high. Artificial aging of flour for a month at 20 percent moisture content and 40 deg. C. had about the same effect as two years in storage. Gluten in the aged flours was coarse and open, very short, and poor in extensibility. Natural aging decreased loaf volume by nearly 30 percent. Storage in the form of wheat makes the changes in gluten quality much slower. Low-temperature storage of flour also inhibits the aging processes. Some naturally inferior wheats yield gluten which closely resembles gluten from aged, deteriorated

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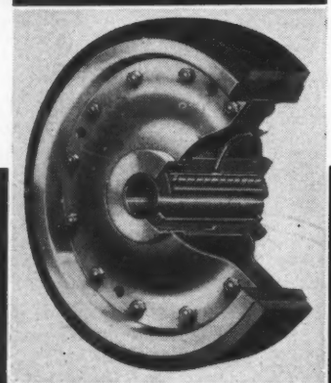

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flour in physical properties. Soil is an influential factor in gluten quality in that the same wheat produces better gluten from a rich black loam, for example, than from a poorer podsolic loam.

Digest from "Changes in the Physical Properties of Gluten With Aging of Flour," by J. D. McKaig and A. G. McCalla, *Canadian Journal of Research*, Vol. 19C, 163, 1941; also issued as Paper No. 182, Associate Committee on Grain Research, Ottawa.

DAIRY PRODUCTS

Oxidized Flora in Milk

IT HAS been found that the level of the iodine content in milk follows the same seasonal variation as the susceptibility of milk to oxidized flavor. Likewise, the carotene content of the butterfat follows this same seasonal trend.

Feeding cattle 5 grams daily of potassium iodide was sufficient to reduce the ascorbic acid content of the milk approximately one-third, but had no noticeable effect on the level of the carotene content. The decrease in the ascorbic acid content did not produce a corresponding increase in the intensity of the metal-induced oxidized flavor. From these results it appears that the level of ascorbic acid in milk may not be as great a factor in the production of milk with low susceptibility to oxidized flavor as was formerly believed.

Digest from "Oxidized Flavor in Milk. X. The Effect of Feeding Potassium Iodide Supplements to Dairy Cows on the Carotene Content of the Butter Fat and on the Ascorbic Acid Content of the Milk and the Relationship to Metal Induced Oxidized Flavor," by W. Carson Brown, A. H. Vanlandingham and Charles E. Weakley, Jr., *Journal of Dairy Science*, Vol. 24, December, 1941, pp. 1035-1039.

PACKAGING

Packaging Foods

A MAJOR TREND in modern food packaging is toward flexible carton materials such as treated paper and organic sheet materials as substitutes for tinplate and glass. Such container materials must be waterproof, moistureproof (*i. e.*, impermeable to water vapor) and greaseproof. Even the possibility of making such containers sufficiently gastight for vacuum packing is receiving serious attention. The usual reason for vacuum packing is that the food product is sensitive to oxidation and so must be protected from air. Sensitivity to moisture is also a common characteristic of foods which need the protection of vacuum packing. Accordingly, the permeability of any material to air (oxygen) and water vapor must be vanishingly small because the protective effect is lost if oxygen or moisture penetrates through the container wall. The permeability of several materials is compared in Table I in which the figures refer to rate of air transmission in cubic centimeters per 100 hours per 100 sq. in. of membrane surface at 98.6 deg. F. under a pressure gradient of 160 millimeters of mercury.

Table I—Permeability

Membrane material	*Thickness*	*Permeability*
Vinylite	.....	over 250
Regenerated cellulose	600 gage	61
Cellulose acetate....	.....	over 250
Cellulose acetate-butyrate	.....	over 250
Ethylcellulose	2 mils	over 250
Rubber hydrochloride	1.7 mils	10

Transparent wrappers may or may not be moistureproof, but coated papers generally are not. Paper can be coated, however, to be both moistureproof and decorative and there should be wider use of such coatings.

Digest from "Current Trends in Food Packaging," by C. A. Southwick, Jr., *Proceedings of the Institute of Food Technologists*, 1941, p. 57.

SUGAR

Ash Content Of Sugar Cane

THE ash content of sugar cane or juice offers a highly informative criterion of quality in selecting the most profitable varieties of cane for sugar production. The salt index (percent sugar divided by percent ash) should be at least 25 when maximum yield of refined sugar is sought. For fermentation to alcohol the prime consideration is maximum yield of sugar per acre, and ash content loses its significance. When both refined sugar and alcohol are to be produced, the high ash canes (up to 0.85 percent ash) can be successfully utilized by reserving the last pressing of juice (highest in ash) for fermentation.

Among the principal varieties, POJ canes are generally low in ash content (0.52 to 0.61 percent), although POJ 161 is a high-ash cane (0.96 percent). As a rule the Coimbatore canes are high in ash (0.78 to 1.05 percent), but Coimbatore 281 ranks low (0.56 percent). The average salt index of five POJ canes was found to be 26.5, the highest being POJ 2878 with a salt index of 30.8. The average for four Coimbatore canes was 18.6, with all but Coimbatore 281 (26.8) ranking much lower than the standard of 25 for canes to be utilized in sugar refining.

Ash composition is important from the standpoint of soil productivity. For

example, Coimbatore canes with their high ash content take out much more potash from the soil than do the POJ canes.

Digest from "Ash Content of Different Cane Varieties as Related to Sugar Refining and to Soil Exhaustion," by Paulo Madon, *Revista de Quimica Industrial*, Vol. 10, 377, 1941 (Published in Brazil).

QUALITY CONTROL

Tenderness of Meats And Vegetables

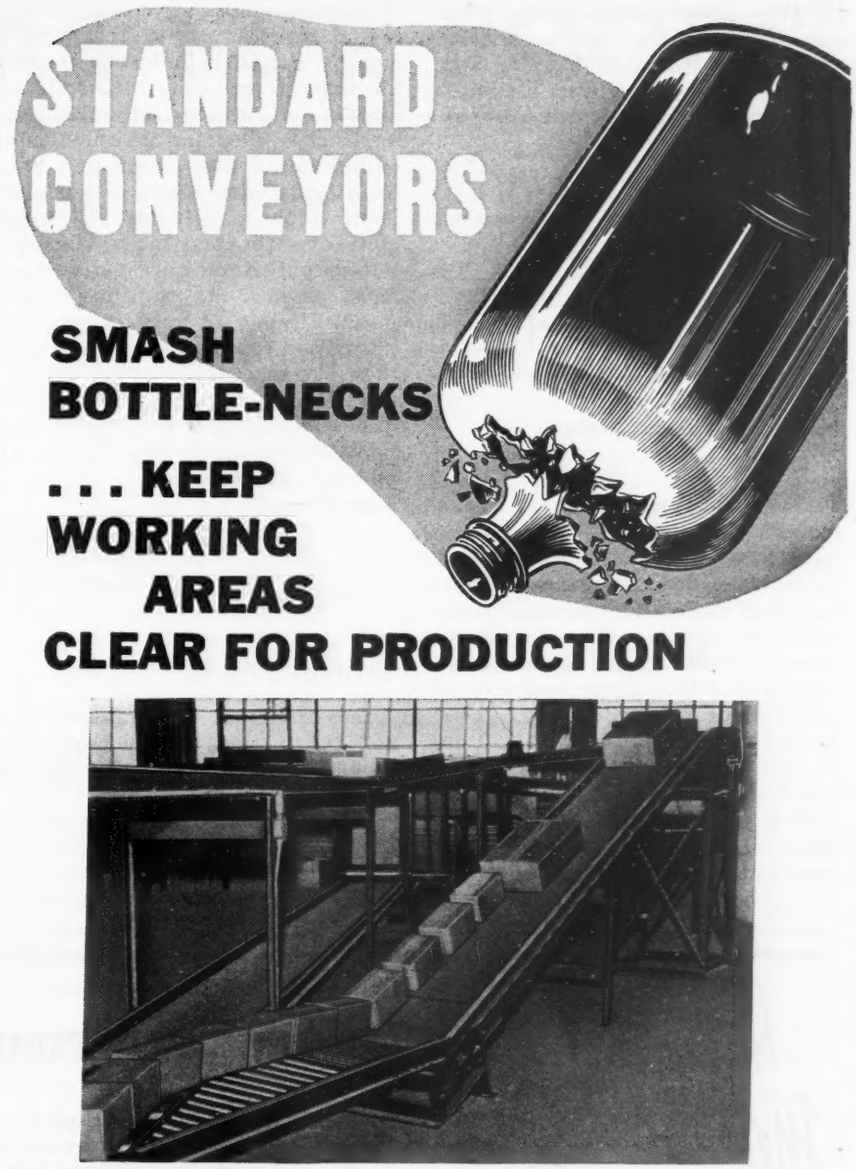
THE STANDARD TENDEROMETER can be successfully used in making objective tests of maturity in the tenderer types of vegetables and of quality in a variety of meats. This instrument, commonly used in judging peas, can be extended to numerous other vegetables and to tender cuts of meat. It is unsatisfactory for reasonably tough meats and vegetables because it is not designed for indicating shearing forces larger than 250 lb. per square inch. A heavy-duty tenderometer was therefore made up for test purposes. It gives readings up to 375 lb. per square inch. Canner-grade round steak, butts of asparagus and parsnips were too tough even for this machine, but its tests were applicable to a much wider range than those of the standard tenderometer. It gave satisfactory readings, for example, with beets, carrots, turnips and cubed round steak. These tests indicate that the standard tenderometer could be successfully applied to a much wider range of tests than is now customary and that tenderometers designed for heavier duty would greatly extend this potential range of usefulness in meat and vegetable testing.

Digest from "An Attempt to Judge the Tenderness of Vegetables and Meats by Means of the Tenderometer," by C. W. du Bois and F. A. Lee, *Proceedings of the Institute of Food Technologists*, 1941, p. 37.

VITAMINS

Vitamin A in Butterfat

AYERSHIRE cows feeding on an average English pasture gave milk in which the butterfat contained 7 International Units (IU) of beta-carotene and 25 IU of vitamin A per gram. These figures are averages of determinations made in two sets (by different workers and different methods) on 10 samples produced in 10 successive weeks. There was close agreement in the analytical results. Vitamin A potencies well above



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100 IU per gram have been reported in some investigations, but most determinations have been within the range from 25 to 60 IU per gram for mixed herds or stated breeds of cattle.

Digest from "Milk Fats From Cows Fed on Fresh Pasture and Ensiled Green Fodder. II. Estimation of Vitamin A Activity," by R. A. Morton, J. W. Lord and T. W. Goodwin, *Journal of the Society of Chemical Industry*, Vol. 60, 310T, 1941 (Published in England).

MISCELLANEOUS

Moisture in Soybean Oil Meal

SOYBEAN OIL MEAL has a higher moisture-absorption capacity before the oil is extracted than after it is extracted. Tests of moisture-absorption behavior have been made with hydraulic, solvent-extracted, expeller and toasted solvent-extracted meal samples. Drying curves were plotted for vacuum drying at 105 and 130 deg. C., air drying at 130 deg. C. and drying in nitrogen at 130 deg. C. It was found that changes in moisture-absorption capacity may be stepwise according to stages of processing. Some oil meals are oxidized, others decomposed, by air drying at 130 deg. C. The principal effects of processing are to decrease moisture retention, increase weight and form volatile decomposition products (probably by hydrolysis under the heat of processing). Conditioned samples of toasted solvent-extracted meal and expeller meal are equivalent in moisture-absorption capacity. Since toasting at certain stages of processing improves the digestibility and palatability of soybean-oil meals, the moisture-absorption test can be utilized as a rapid method of estimating relative nutritive value of toasted solvent-extracted and expeller meals, by reason of their like capacity for absorbing moisture. Hydraulic meal is less sensitive to oxidation than solvent-extracted meal, probably because solvents extract a natural antioxidant which is retained in hydraulic meal.

Digest from "Moisture Content of Soybean Oil Meals," by A. C. Beckel and T. H. Hopper, *Industrial and Engineering Chemistry*, Vol. 33, 1448, 1941.

Protein Fibers

EXPERIMENTS are being made in regard to ways in which natural proteins can be modified so that they will form fibers effectively.

The technic developed involves treating of the protein material with certain synthetic detergents. The result is a molecular orientation which gives longitudinal arrangement in a form that produces extensible fibers. Apparently this technic is applicable to many, not most, protein materials. The product is a form of protein which can be drawn into fibers if processed immediately after the treatment. The desired property disappears rather quickly. However, the time interval during which it persists seems to be sufficient to permit commercial fiber formation.

There is a possibility that very cheap waste raw materials containing protein may be made useful in the formation of fiber by this method. The character of the fiber formed seems to vary somewhat with the source of the protein. It is too early to indicate what the relationship is between the raw material and the fibrous product. It appears, however, that the fiber can be spun, woven and utilized in fabrics which stand up well during laundering. Whether the fiber will be a substitute for wool or for other fibers, is not yet known.

Those investigating any synthetic fibers and desiring further information may consult directly with the staff of the Western Regional Research Laboratory of the Bureau of Agricultural Chemistry and Engineering.

Waste Disposal

FIELD STUDIES have been conducted on the treatment of pea and corn canning wastes in domestic sewage-treatment plants. Tests show that pea and corn wastes were not benefited by the addition of ammonium and phosphate salt, but that two other factors, namely, filter loading and pH, were involved. Of these two variables, only the pH could be controlled. With a heavily overloaded recirculation type of filter, such as the one at which these tests were made, lime was not considered an ideal chemical for the control of pH. Studies were therefore made using soda ash for this purpose. By considering various tests whose filter loadings were approximately the same, it was found, in every case, that a greater filter efficiency was obtained with the higher pH. The increased efficiency due to pH control varied over a wide range, being most effective with the more acid wastes.

Various reports have been made on the treatment of lagooned cannery wastes with nitrate of soda. It has been stated that during the past year one canner successfully treated the entire discharge of corn wastes with nitrate of soda.

Digest from "Waste Disposal," by E. J. Cameron and J. R. Esty, Annual Report to the Research Committee, 1941, National Canners Association Research Laboratories, Washington, D. C., January, 1942, p. 15.

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FORMULAS FOR FOODS

FORMULA NO. 305

Army Ration C (M-Unit)

Meat and Beans (Type I)

Beef	25 lb.
Pork	25 lb.
Dry beans	22 lb.
Tomato juice or pulp	28 lb.
Salt	17 oz.
Celery salt	5.5 oz.
Pepper, black	0.4 oz.
Sugar (white, granulated)	30 oz.

Directions

The beef used shall be from carcasses of a grade not lower than American Meat Institute's Grade 8, using the entire boneless carcass except shank meat, skirts, hanging tenderloins, flanks, flank steaks, navel ends, finger trimmings and tenderloin. Frozen beef that has been in a freezer not to exceed 180 days, and which shows no evidence of deterioration, may be used. The cuts used shall be in approximately the proportions normal to such carcasses. Beef shall retain not more than 5 percent of trimmable fat.

The pork used shall be lean pork with not more than 20 percent trimable fat. Frozen pork that has been in the freezer may be used if it does not exceed 180 days and shows no sign of deterioration.

Beans used shall be clean, sound white beans of any of the following classes (Official U. S. Standards for beans): I, V, VIII, XI and XII. Tomato juice used shall be U. S. Grade A (fancy).

If pulp is used the specific gravity shall not be less than 1.035.

The weight of meat must be based on the weight of raw meat before braising. If fresh (unfrozen) meat is used, it shall be ground in a meat grinder fitted with the plate having holes approximately ¾ in. in diameter. If frozen meat is used, the grinder shall be fitted with a plate having holes approximately 1 in. in diameter. Meat shall be braised until medium well done, with only enough added moisture to prevent burning. All of the juices from the meat are to be included in the finished product.

The bean component of the formula shall be based on the weight of the dry beans before soaking. The beans shall be soaked in water in accordance with best commercial practice.

The braised meat, vegetables, tomato juice or pulp and spices are thoroughly mixed. Water may be added, if necessary, to bring the moisture content of the finished product within the prescribed range. After thoroughly mixing, the product shall be filled into tin cans, size 300x308. The cans are then exhausted, sealed and processed. The moisture content of the finished products shall not be less than 71 percent and not more than 75 percent by weight. Each can shall be scored with a key-opening band. Cans should be filled in accordance with best commercial practice, but net contents of cans shall not be less than 12 oz.

Formula from "Tentative Specifications for M-Units, U. S. Army Field Ration C," Chicago Quartermaster Depot, No. 25B, January 15, 1942.

FORMULA NO. 306

Butter Brownie Prepared Mix

Sugar	42 lb.
Salt	4 oz.
16-concentrate pure or imitation vanilla	2 oz.
Concentrated butter flavor	½ oz.
Powdered corn sirup	6 lb.
Butter	3 lb.
Totally hydrogenated shortening	17 lb.
Soda	3 oz.
Baking cream (cream of tartar substitute)	6 oz.
Cake flour	20 lb.

Mixing Directions

Cream together the sugar, salt, vanilla, butter flavor, corn sirup, butter and shortening. Sift the soda, baking cream and cake flour and add to the above mixture. Put aside for use.

Formula from Parker-Broeg.

FORMULA NO. 307

Butter Brownie from Prepared Mixture

Prepared butter brownie mixture (see Formula No. 306)	5 lb.
Whole eggs	1 lb.
Water (variable)	8 oz.
Pecans or walnuts	8 oz.

Mixing Directions

Place the prepared butter Brownie mixture and 8 oz. of whole eggs in machine mixing bowl. Have all ingredients as near 80 deg. F. as possible. Mix on low speed only until the dry mixture is wetted, then put on high speed for two minutes. Scrape bowl. Then add additional 8 oz. of whole eggs and beat one or two minutes more on high speed. Add water. Scrape bowl and mix smooth. Add pecans or walnuts and mix only enough to incorporate. Do not continue mixing after nuts are added or nuts will be broken too much. Scrape bowl and put batter in a heavily buttered and dusted, straight-sided 17 x 25-in. sheet pan. If sides are not straight, it is best to put a wood frame inside the pan.

Bake at 225 to 350 deg. F. only sufficiently to cook the Brownie. It should not be overbaked, usually 40 to 45 minutes at 350 deg. F. If the Brownie is not baked enough it will not have a chewy character. If it is baked too much, it will lose flavor and be too hard and dry. This should be a very chewy Brownie. If desired, sprinkle chopped pecans on top before baking.

Formula from Parker-Broeg.

FORMULA NO. 308

Regular Water Icing

Sugar	4 lb.
Sugar sirup (30 deg. Baumé)	4 lb.
Concentrated maple sirup (2½ fold)	8 oz.

Cook the sugar sirup to 220 deg. F. Place in a mixer and mix until smooth.

Formula from Quebec Maple Sugar Producers.

FORMULA NO. 309

Camp Bread

Bread flour	13 lb.
Water (variable)	1 gal.
Yeast	4 oz.
Salt	3 oz.
Sugar	8 oz.
Shortening	4 oz.

Directions

Dissolve the yeast in part of the water. Add the salt and sugar to the balance of the water. Place in mixer. Add flour and when partially mixed add the yeast solution and follow with the shortening. Mix until smooth; however, do not fully develop dough in mixing. Dough temperature should be 78 deg. F. Time for first rinsing, 2½ hours; to bench or divider in 1 hour.

Scale 28 oz. for 1½-lb. loaves. Round up and give 30 minutes to recover in proof. For Army-style loaf, scale loaves 2 lb. 4 oz. or 4 lb. 8 oz. and round up. Give 15 minutes to recover in proof.

Place crosswise in lightly greased pan.

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Dust top of loaves with flour and proof.

Oven temperature, approximately 400 to 410 deg. F. Baking time should be 45 minutes for seven 1½-lb. loaves. Can be made up in either Army Camp or Field style loaves.

Formula from General Mills, Inc.

FORMULA NO. 310

Tomato Bouillon

Tomato juice	16 lb.
Bay leaf	0.4 oz.
Onion (chopped)	3 lb.
Cloves (whole)	0.4 oz.
Butter	4½ oz.
Salt	1 oz.
Pepper, black	0.2 oz.
Celery salt	0.3 oz.

Directions

Cook tomato juice, bay leaf, onions and cloves to boiling point and let simmer. Strain and add butter and seasoning and stir until butter is blended into bouillon.

FORMULA NO. 311

Spice Blend

Sugar	6 lb. 1.5 oz.
Salt	6 oz.
Nutmeg	12 oz.
Mace	6 oz.
Cinnamon	3 lb.
Ginger	6 oz.
Allspice	6 oz.
Clove	6 oz.
Ground cardamon	1.5 oz.
Powdered gum karaya	6 oz.

Mix ingredients together and pack in friction-top cans.

Formula from Parker-Broeg.

FORMULA NO. 312

Potato Cake

Sugar	4½ lb.
Shortening (part butter)	2¼ lb.
Mashed, boiled potatoes	1 lb.
Cake flour	4½ lb.
Baking powder (variable)	1½ oz.
Cinnamon	1 oz.
Salt	1 oz.
Milk (variable)	2 lb.
Whole eggs	2 lb.
Chopped raisins	½ lb.
Chopped nuts	6 oz.

Mixing Directions

Cream the sugar, shortening, and potatoes, until light. Blend the cake flour, baking powder, cinnamon and salt by sifting. Add this flour mixture and the milk alternately and mix until smooth, but do not overmix. Next add the whole eggs gradually into the batter and continue beating until light and fluffy. Add the chopped raisins and

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Outlines of Food Technology

by

HARRY W. VON LOESECKE

Senior Chemist in charge, U. S. Citrus Products Station, Winter Haven, Fla.

THERE has long been a need for a comprehensive volume covering the essentials of modern practice in the preparation and handling of foods; and the problems arising from the war have accentuated this need. This book is designed to serve both as a reference work for those engaged in all phases of the food industries, and as a textbook for use in connection with the courses in this field which are being added to educational curricula all over the country. Such pertinent matters as the respective merits of tin cans and glass containers, quick-freezing, and dehydration of vegetables are discussed, as well as fortified milks and wheat flour. Chemical analyses of the more important products are given, and a handy list of references for further reading is appended to each chapter. A feature of this handsomely bound volume is the large number of well-chosen illustrations, including original line drawings executed by the author.

MR. von Loesecke is a native of New England and a graduate of Harvard University. In addition to supervising the work of the Citrus Products Station at Winter Haven, Florida, he has contributed numerous technical articles to leading chemical publications. At present he is carrying on research for the U. S. Department of Agriculture's Western Regional Laboratory in California.

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nuts last after first mixing them with 2 oz. of the flour mixture. Work lightly into the mix.

Sweet potatoes or pumpkins can be substituted for Irish potatoes and the name changed accordingly.

Bake at 350 to 365 deg. F.

Formula from General Mills, Inc.

FORMULA NO. 313

Plain Custard Pie

Whole milk	8 lb.
Granulated sugar	3 lb.
Salt	¼ oz.
Vanilla	1½ oz.
Frozen eggs	2 lb. 12 oz.

Mixing Directions

Heat the milk to 140 deg. F. Mix the sugar, salt, vanilla and eggs. Add the milk and stir until the sugar is dissolved. Mix well, but do not beat. Skim off the foam from the surface. Pour into unbaked shells. Sprinkle nutmeg on top if desired. Bake at 450 deg. F.

Formula from Swift & Co.

FORMULA NO. 314

Waffle Mix

Sugar	36 lb.
Salt	15 lb.
Totally hydrogenated shortening	120 lb.
Soy flour	18 lb.
Milk powder	36 lb.
Soda	12 lb.
Pure cream of tartar	12 lb.
Egg yolk	40 lb.
Malted milk	9 lb.
Cake flour	360 lb.
Bread flour	240 lb.
Powdered tumeric	2.5 oz.

Mixing Directions

Mix ingredients together. Add a sufficient amount of liquid milk or water to produce a batter of medium consistency. Usually approximately 1 lb. 4 oz. of liquid milk to 1 lb. of flour. Batter should not, however, be excessively soft.

Formula from Parker-Broeg.

FORMULA NO. 315

Cast Maple Creams

Condensed maple sirup (2½ fold)	2 lb.
Regular stock fondant	20 lb.

Mixing Directions

Melt down the stock fondant in a jacketed kettle and add the maple, as you would a "bob." Cast in starch at blood heat, allowing the centers to remain in starch overnight. Coat with a semisweet vanilla chocolate or maple bonbon coating.

Formula from Quebec Maple Sugar Producers.

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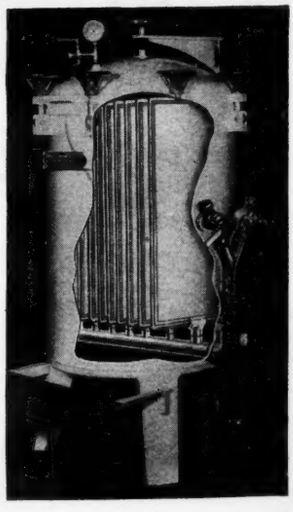

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